QH
181
S62X
NH

574.95125
.S62

OUR ISLAND

A

NATURALIST'S DESCRIPTION

OF

HONGKONG.

BY

SYDNEY B. J. SKERTCHLY, F.G.S., M.A.I.
(Late of H. M. Geological Survey).

HONGKONG:
KELLY & WALSH, LIMITED
AND AT
SHANGHAI, YOKOHAMA, AND SINGAPORE.

1893.

(All Rights Reserved).

OUR ISLAND.

Registered in accordance with the provisions of Ordinance No. 10 of 1888,

at the office of the

Registrar General, Supreme Court House, Hongkong.

QH
181
S62X
NH

OUR ISLAND

A

NATURALIST'S DESCRIPTION

OF

HONGKONG.

ouber. osiale

BY

SYDNEY B. J. SKERTCHLY, F.G.S., M.A.I.
(Late of H.M. Geological Survey).

HONGKONG:
KELLY & WALSH, LIMITED,
AND AT
SHANGHAI, YOKOHAMA AND SINGAPORE.

1893.

(All Rights Reserved).

SMITHSONIAN INSTITUTION
337368
JUN 11 1948
NATIONAL MUSEUM

574.95125
S62

PREFACE.

The Arabs tell us it is always darkest before dawn. It looked very black as I wrote, but light was breaking through the clouds, and Our Island is flushed in the dawn of the *Odd Volumes*, a society formed to make us know and understand ourselves and our island better than before. So let me dedicate this little work to you my brother tomes: its oddities are inherent; its slender claim on the title "volume" its greatest recommendation. It is but a glimpse into the great garden, but the vistas are true, the colours accurate, the perspective correct.

S. B. J. S.

Kowloon:—Hongkong,
1st March, 1893.

CONTENTS.

CHAPTER I.

A FIRST PEEP AT THE ISLAND.

Our ignorance of the island—Shanghai societies—A Christmas scene—After-glows—Autumnal tints—The land of double shadow—From the Peak—Night glories—Sensitive plants—Lantana—Asclepias—Amoy. 1

CHAPTER II.

THE BUILDING OF THE ISLAND.

Town geology—A Granite City—Range of the granite—Diorite—Porphyry—Slates—Sands—Kaolin—The origin of *China*—Decomposed granite—Granite skeletons—Chemical *versus* mechanical force—Rain and rivers—Carbonic acid—The geological pendulum—The island once forest-clad—*Homo ligniperdus*—Chlorophyll—A broken tombstone—The mysterious boulders—Granite veterans—The death of granite. ... 10

CHAPTER III.

IN THE GREAT LABORATORY.

The birth of granite—Microscopic cavities—Imprisoned gases and liquids—Liquid carbon dioxide—The birth-place of granite—Miles of rock removed—Granite and pumice—Crystalline rocks—Felstone—The island volcanic—What a volcano is—Story of a volcano—Fusiyama and Hongkong—Gem-making—Nature's laboratory—Diorite—Ovifak iron—Native metals—From death to life. 18

CHAPTER IV.

THE CLOTHING OF THE ISLAND.

The privilege of island life—Plant waifs—Plants of tropical Asia—Plants of S. China—Himalayan plants—Malay plants—Plants of the Pacific—Our plant census—Northern stragglers—Hongkong and Shanghai—Peak violets—Island natives—Violets and primroses—The tide of life—Plant destroyers—A lost rhododendron. 26

CHAPTER V.

THE WAVE OF LIFE.

The stream of life—A glacial sketch—Mountains the islands of the land—Absence of glaciation from China—The messenger winds—N. China a new land—The pedigree of our plants—Fossil plants—Cinnamon—Club-moss—Stanley graveyard—A historic parallel— Ferns—Trees and their antiquity—Origin of the China-America flora. 33

CHAPTER VI.

THE PEOPLING OF THE ISLAND.

Our butterflies—Mr. J. J. Walker, R.N.—Euplœas and whites—Fearless and shy butterflies—Variable vital force—Like grandfather, like child—Difficult species—Seasonal varieties—Value of butterflies to science—Mimicking butterflies—A new case—Protective resemblance—Range of our butterflies—The Red Admiral—Local species—Hongkong butterfly gems—The Happy Valley—Butterfly pedigree. 42

CHAPTER VII.

THE SCULPTURING OF THE ISLAND.

The instability of the land—Time gauges—The geology of the poets— Old sea-beds—Antiquity of oceans—Asia's real coast-line—Lost lands—How our island was severed from the mainland—Effects of a slight depression—The age of Formosa—The island never submerged since early geological times—St. John's Monkey—Our special butterfly—*Homo ligniperdus* again—The carving of the hills—Heavy rainfall—What the river-sediment reveals—Regeneration—Finis. ... 50

OUR ISLAND.

CHAPTER I.

A FIRST PEEP AT THE ISLAND.

Our ignorance of the island—Shanghai societies—A Christmas scene—After-glows—Autumnal tints—The land of double shadow—From the Peak—Night glories—Sensitive plants—Lantana—Asclepias—Amoy.

WE are proud of our island, though at home it is generally associated by strangers with the refrain of a song that hardly does justice to its beauty or importance. Its history is bound up with that of British enterprise in the East, and with the slow-breaking dawn of a great hope, the awakening of China. Its story may be read in many a printed volume, ranging from the stately Blue Book to the recent dashing descriptions of Admiral Kennedy in the Boy's Own Paper. All these record but deeds of daring, diplomatic struggles, commercial and social successes, and with our island itself we are, as a rule, not familiar, nor are we likely to be, until some good spirit arises to infuse a love of nature in our younger members as strong as the love of sport. What wonder they know not our island at home when we neglect her here? In hopes of stimulating local investigation this pamphlet is written.

To the North lies a flourishing town, known to us in friendly criticism as the Model Settlement. No spacious harbour shelters the fleets upon its waters; no noble hills look down upon clear blue sea—but a shallow bar is the difficult gateway to its mud-laden stream, flowing through a country flat and monotonous as the fens. Yet in this settlement can be found more than one Society where young and old meet and discuss problems alike of social, political, and scientific interest. Here, on our island, sport is vigorous (as it should be), music and the drama have each their skilled enthusiastic representatives, painting maintains a feeble and diminishing footing; but there is no centre for the study of our island itself, and, save for the ably-administered Botanic Gardens, the elucidation of Nature is in as backward a condition as in China itself. Nor have matters improved of late years; where are the successors of Hance and Swinhoe and others who worked up our flora and fauna? Above all where are the young men to carry on the work, and who is to encourage and help them! Surely, surely, we are not steeped in such intellectual poverty as this. It is hardly a credit to find still on sale works, issued for our edification, telling us that Hongkong possesses many insects, such as snails and worms, and owes its fever to the presence of felspar!

Another object we have in view: to give home readers some idea of our island; so that, when next they tell their friends to "go to Hongkong," they may hail the request as gladly as Maud her invitation to come into the garden.

Not exactly a "summer isle of Eden lying in dark purple spheres of sea," our island is yet very beautiful; and laying down to-day's paper with its telegram announcing the freezing of Thames and Severn, this is what the New Year's sun shows me through the open window of the verandah. A landscape bathed in sunshine with no cloud visible in the clear blue sky, save where a new-born cumulus floats from a saluting man-of-war, curling in vortex-rings against a background of finely sculptured hills. Cast shadows of deep-purple fall across deep nullahs, in which still lies a pearly veil of morning mist; a clear turquoise scarce-rippled sea is ploughed in dark furrows by steamer and junk; and the eye follows winding fretted coast and peaked island away "beyond the verge." It is just cool enough to sit with open window and write; but, as the sun goes down beyond high Lantao, fires will be lit to warm the house, by the time the heavens have ceased to glow with hues fine as the "Krakatao tints" that lit up London while Ruskin was bewailing, as his sight grew dim, that God had forgotton to be gracious, and did not send us sunset glories as in his youth.* Dying day in Hongkong is something to be thankful for; not the painted canvas of Venice fisher-boats outshines the red-gold of a junk's sails as they catch the level beams; not the beauties of an Alpine evening can outmatch the blood-red hills of Hung Hom, cut clear as crystal against the deep purple of the peaks of Tai Mo Shan. And just now we have that autumnal sadness on the hills that is wanting in lands deeper in the tropics, for the reds and browns and yellows of the

---

* After the eruption of Sanguir on July 7th, 1893, we had magnificent afterglows in Hongkong, due to the suspended volcanic dust. They attained their maximum brilliancy in the middle of December, and have hardly yet died away. (16th March 1893).

Stillingea or wax-tree, are a welcome substitute for fading maple, beech, and birch at home. The sleepy ever-greenness of the equator is here replaced by well-marked seasons, and though the cocoa-nut and banana, croton, hibiscus and poinsettia, remind us we are within the realm of double shadow, as the poet calls it, many a bare and leafless tree tells that Christmas has come.

Climb with me, O my home-friend, some fourteen hundred feet up to the gap by the Peak, and find language to describe the scene of cliff and scar and winding bay, of hill and vale, mountain and island and rock visible on either hand; for here we stand on the very backbone of our island, and the sea has gathered a deeper hue, and distance transformed village and city into things of beauty. Equalled it may be, and is, but surpassed, hardly. Yet have we heard folk say there is no beauty here: may be it is so if eye be dim and heart be dull, but the jingle of the dollar is not sweeter than the twitter of the bird; the crackle of a bank-bill not more musical than the rustle of a leaf. Let us be thankful earth is full of beauty and eyes still bright to make it ours. How if those eyes were not attuned to all this colour-music, and nature appeared robed in sober russet? And it might easily have been so; just as even now we cannot see the light that is most powerful to the eyes of ants, and as few can discern the tints of the lunar bow. To deny the beauty of our island is to proclaim the beauty-sense wanting, to declare Andrea del Sarto no better than a silhouette-cutter, or D'Aguilar Street ship's portrait painter. The night scene from the Gap is equally impressive, and was more so before the electric-light blotted out the myriad sampan-stars and house-lights, which caused sea and land to twinkle like another heaven below.

Nor, speaking of the night-glories, must we omit the phosphorescence which on most occasions is visible, and often extraordinarily vivid in the harbour. The weird light is emerald green, or milk-white or wine-red, but generally green of the intensest colour. It is chiefly due to the common *Noctiluca*, though many minute crustacea add their quota to the display. When, as has so often been the case lately, the after-glow paints the sea crimson, the foam-lines from the launches look like streams of glowing emeralds in a field of shining ruby. Only Holmes' angel who "dipped his sapphire pen in rainbow dew" could depict a scene like this: and in contemplating its magnificence one forgets awhile how these same waters assume a fearful grandeur when lashed by the great-wind, the typhoon, the tai-fung, which some stay-at-home meteorologists feign to derive from the Greek *typhon*, whirling, with as much truth and less excuse than our blue-jackets decide that Tai-mo-shan is so y'clept from being like a tam-o-shanter.*

These are but the surface beauties of the island, free to all whose heart is fresh: but there are deeper, finer pleasures to be garnered if one but knows how to gather in the harvest. Look at this sensitive plant that—

> "opened its fan-like leaves to the light
> and closed them beneath the kisses of night":

---

* It is, however, curious that the Egyptian god Typhon was the chief author of evil; and hence in Acts xxvii. 14, a tempestuous wind is called a Typhonian wind.

closes them indeed before the faintest shock or breath of cold. It carpets every wayside, and with strange persistency ousts the other herbs, until it forms sheets and patches of the strangest vegetation in the world. If one has come out by the old route the first glimpse of the sensitive plant is caught at Penang, thence it is found all the way to Hongkong, but does not go northward. Now if we turn to Bentham's Flora Hongkongensis, date 1861, or Hance's supplement thereto, 1872, no mention is made of this most interesting, and very common plant; for the simple reason that it was unknown to those authors as a denizen of our island. It is a stranger, a waif from South America; and how it got here, seeing no man voluntarily brought it, is an unsolved puzzle. It has come to us, not directly across America by the Pacific, but the other way round, *via* Africa and India, where it has established itself, and whence it has spread all over the settled parts of the Straits, and bids fair to people all the islands of the Archipelago. It reached North Borneo about 1886, taking up its first abode on a little island with only one European house. Unravel the story of its travels and you will have solved one of the problems of that interesting study—the distribution of species. No people cultivate the sensitive plant, no animal feeds upon it, yet it has followed man in all his tropic wanderings, save one: it has not gone with him across its own home, America, except by way of the Panama isthmus whence it has gone down the coast of Peru. We call it "accidentally introduced," because we do not know how it establishes itself in fresh haunts: its stiff hairy seed-pods enable it to cling to clothing, to the coats of animals, to packages of merchandise and what not, and so afford it means of transport. The remarkable, almost animal, power of movement of leaves and leaf-stalks shows it to be a peculiarly specialised plant, but what gives it its power of establishing itself in foreign countries, and why it prefers the eastern hemisphere to its native western home, is as utterly inexplicable, as yet, as how it comes about that the crypt of Canterbury cathedral is the home of a vicious little tick* that is not found nearer than Persia. The tick probably came with the pilgrims, the sensitive plant probably went to West Africa in the slave ships; why they should survive and hundreds of other introduced species fail to establish a foothold, we do not know. Still we cannot but look upon our plant with surpassing interest, and see a fresh illustration of the apostolic axiom that none liveth unto himself.

Other plants now common in our island tell similar stories. This rough-leaved, orange-flowered shrub *Lantana*, in flower, practically, all the year round, attractive beyond all others to the insect world, and now common over most of the lower parts of the colony, is also a native of tropical America. It possesses no specialised contrivances like the sensitive plant, though like it, it is covered with prickles or rough hairs. Its showy flowers have often led to its cultivation, and to this cause it *may* owe its introduction to Hongkong. But we may safely say it would have got here without our voluntary aid, just as it has to some of the islands of the archipelago and of the Pacific. But it possesses remarkable powers of adaptation, and whereas, in 1861, it is reported as "now naturalized in the Happy Valley," in this year of grace 1893 it has made itself at home everywhere including British Kowloon. It is quite possible some, at least, of this colonising power is due to the charm it possesses for insects, a pleasant habit which ensures its flowers being abundantly fertilised and an inexhaustible supply of seeds produced. Its prickly stems, rough leaves, and aromatic glands, also give it strong aid in the struggle for existence. But when all these causes are discounted, we are still far from having given a complete answer to the question why it has succeeded in following man all over the tropics and of thriving independently of him.

---

* Argas Reflexus.

The wild ipecacuanha, *Asclepias curassavica*, a native of the West Indies, has run over much of our island, and pretty well everywhere else in the tropics, and though a mere "weed" is interesting as being the apparent cause of the spread of a butterfly—a *Danais*, closely allied to a common Hongkong form—from America, eastward to the Azores and Britain, westward throughout the Pacific Islands to New Guinea, the Moluccas, and Celebes, within the past few years. As the food plant has got here it is not improbable the insect will arrive ere long. So one might go on enumerating plant after plant that has run wild in Hongkong within the last fifty years, just as the aloes are beginning to do in Kowloon, and all giving food for reflection upon the great problem as to how the earth has been peopled. And our island is peculiar in being the most northern range in Asia of many plants. Amoy, so close to us, so like us in climate, has its own plants, native and introduced, some of which, like the ivy, will not thrive here, though the conditions, as far as we can see, are the same. These plants we have glanced at are strangers, so are we; many of them fail in the struggle for existence, so do we; some establish themselves and become acclimatized, and so do some of us; some plants have peculiar habits; so have some of us.

CHAPTER II.

THE BUILDING OF THE ISLAND.

Town geology—A Granite City—Range of the granite—Diorite—Porphyry—Slates—Sands—Kaolin—The origin of *China*—Decomposed granite—Granite skeletons—Chemical *versus* mechanical force—Rain and rivers—Carbonic acid—The geological pendulum—The island once forest-clad—*Homo ligniperdus*—Chlorophyll—A broken tombstone—The mysterious boulders—Granite veterans—The death of granite.

CHARLES KINGSLEY long ago showed us, in his charming *Town Geology*, how much of the structure of a country could be learned by a study of the building-stones of its cities. So it is apparent to the stranger that Hongkong merits the title of the Granite City, as truly as does Aberdeen the Grey. The wealth of granite is very striking; great fifteen-foot stones take the place of wood for door jambs and plinths even in common-place Chinese houses, and the scarred hill-sides and break-neck stone-shoots and quaint old Egyptian-looking creaking stone-trollies, all attest that this is a land of granite. It is this that gives Hongkong such a personal character. Shanghai, with its red brick and beautiful Ningpo stone, is more like an ordinary English town. But Victoria—Hongkong's capital—has its very character impressed upon it by the granite of which it is built—more so too than most stone-built towns, for the scarcity of timber, the cheapness of labour, and the great size the stones can be quarried, make this tough imperishable rock take, as has been suggested, much of the place usually occupied by timber.

This granite forms a broken fringe from S. China to Manchuria, overlaid about Ningpo and Chusan by comparatively recent volcanic-rocks, and in eastern Shantung by archæan schists and quartzites. It is, apparently, extremely old, and seems to form part of the original backbone of Asia. But though its granite stamps our island with a character of its own, this is more apparent than real, and is due rather to the commercial value of the rock than to its extent.

The ignorance displayed of the structure of our island is so profound as almost to command respect. Within the last few weeks the unchallenged statement was made in our legislative council that Hongkong produced nothing but granite, though as a matter of fact quite half the island is made up of other rocks. Of these other rocks the oldest is diorite or 'greenstone,' an old trap rock that breaks through the granite and can be well seen at West Point or Mt. Kellet. Newer than this, forming great sheets and masses in the Peak district, and coming down to sea-level at Stanley and Cape D'Aguilar, where its superposition to the granite is well seen, is a felspathic quartz porphyry. This rock is of true volcanic origin, and is a genuine lava; that is, a rock which has been poured out on or near the surface and solidified there, as distinct from the plutonic rocks, like granite and diorite, which solidified deep underground. Here and there, as at West Point, patches of slaty rocks of, as yet, unknown age, are said to occur*; and these, with the extensive masses of decomposed granite and the sandy alluvium of the streams, complete the tale of the geological beds of our island.

Now, suppose it were true that we had no rock but granite about us. Let us see if that is not of itself sufficiently interesting to redeem the island from the charge of geological barrenness. Look closely into a piece of granite, and notice the glassy opaque white crystals of felspar. It is of the variety known as *orthoclase*, and contains much potash. When our rains fall, warm and copious, they dissolve quantities of carbon dioxide, and this carbonic acid—to use its time-honoured name—is a powerful solvent of felspar, eating it away by turning its potash into a soluble carbonate, which is carried off by the water, while the residual silicate of alumina combines with a portion of water and is left as a white, peculiarly unctuous clay.

This clay is then gradually washed free from the loosened quartz and mica of the granite, and, becoming deposited in more or less pure beds, constitutes the celebrated *Kaolin*, the China clay of the potter, whence the name *china* has become applied to the finer kinds of earthenware. Here, then, is quite a little romance in the story of our decomposed granite, for by it the whole history of the potter's art in Europe was changed, and the very name, *china*, remains to testify to the original source of the material which revolutionised the ceramic art.

Few rocks are so hard as granite; yet 'continual dropping weareth away a stone,' but in this case the change is very extraordinary. Granite has a strong tendency to break up into rough cubes with rounded edges, and the ceaseless action of the rain, by decomposing the felspar, has reduced that rock—the type of stability—to a friable mass soft enough to be dug with a spade; and this weathering action has proceeded to a depth often of sixty feet or more. It is not a mere mechanical breaking down of the rock, but a subtle chemical change, loosening the texture of the rock by the removal of one of its ingredients, while leaving its structure intact, a skeleton of the old granite, as we can get a skeleton of some plants by digesting them in acid.

---

* I have, hitherto, sought for them in vain.

Very instructive are the sections of decomposed granite exposed in new road-cuttings; every phase of the process can be seen, from masses of still-untouched granite to perfectly disintegrated matter showing the typical granite structure, in proof that the disintegration has taken place *in situ*, and is not the rolled detritus of the rock mass. Eastern fable tells of victims petrified into translucent chalcedony, through quaffing a mysterious wine which atom by atom removed the tissues, and replaced them with stone, until at length statues were formed, ghastly in their absolute faithfulness—for they were indeed the real bodies, transformed, but still the true bodies. The story is impossible, but very like what takes place in decomposing granite, if we remember that only one of the granite's tissues is removed and nothing added to replace the lost substance. The form of the granite remains, the general structure is untouched, but virtue has gone out of the stone and only a wrecked semblance is left behind.

But the mechanical action of the rain—especially such heavy rains as we get here—is very great, and is constantly carrying away portions of the decomposed granite bodily, to swell the mass of sands that fill the valleys, and form the beaches of our coasts. The rain and the streams have thus two destructive functions, one chemical, one mechanical—the one selective the other indiscriminating—the one, to use a not inapt metaphor, daintily sapping the life-juices, the other rudely breaking down the dead body and scattering its fragments.

In order that masses of decomposed granite shall remain on the original surface, it is clearly essential that the chemical action shall be speedier than the mechanical, or the face of the granite would be swept clean, as it is in most places elsewhere. If we carefully examine the exposed surfaces it will be seen that, so far from this being the case, the decomposed granite is suffering rapid waste—the rains are carrying away the accumulations of past times, and performing their mechanical task more rapidly than new material is being formed chemically. It is, indeed, hardly possible for the very trifling amount of carbonic acid in normal rain-water to eat into the solid granite as rapidly as the water itself can remove such crumbly material as decomposed granite. The mechanical power is strong enough to keep pace with, and even outstrip the chemical power. Yet the decomposed granite is proof positive that the chemical forces have been the greater.

The explanation of the seeming puzzle lies in the expression "have been"—the chemical forces are no longer the stronger; and the pendulum of geologic change has swung to the mechanical side. In other words, there was formerly a greater supply of carbonic acid than at present. But whence was it derived? The answer is a curious one. If we investigate the regions where decomposed granite (or similar rocks) lies thick, we shall find the greatest accumulations in the forest regions of the tropics. In central America, in Borneo, and such lands of primeval forest, the finest examples are seen, and a combination of forest and copious rain seems essential to the process.

It will at once be pointed out that China is the most treeless of lands, and that but for our forest-department the island would be as bare as the hills on the mainland. So too one may cite Cornwall, with its 'Cornish clay' the precise analogue of the 'China clay,' where decomposed granite is dug twenty feet deep for the extraction of English kaolin, English China-clay, and where the hills are bare and the rainfall not excessive. Just so. But in the great 'head gravels' of Marazion, in the peat-beds of old stream-tin workings, we have definite proof that in recent geological times Cornwall was clothed with forest, and bathed with heavy rain. The answer is now patent—Our island was once covered with forest—that forest has gone from us, as it has from China. One of the reasons of this is the tree-destroying tendency of the native—a vice so ingrained that one might well-nigh suggest the Chinaman to be a different species from ourselves, not *Homo sapiens* at all, but *Homo ligniperdus*, the wood-destroyer. Other causes, such as our insular position, have acted in the same direction, but the fact remains, that the former forest clothing of our island is attested by the existence of the decomposed granite.

Let us now see how trees affect the quantity of carbonic acid. About one half of the substance composing a plant is carbon, as one readily sees in charcoal, which is simply some of the original carbon of the wood. Every atom of this plant-carbon is abstracted from the carbon dioxide in the atmosphere, and it is the peculiar function of the green colouring matter of leaves *(chlorophyll)* to absorb this gas, which is then broken up, the carbon extracted, and the oxygen turned loose again. When we consider that atmospheric air only contains 0.04 per cent of carbonic acid, the delicacy and magnitude of this carbon-gathering process can be appreciated. But green leaves can only perform this important duty under the influence of light, practically of sunshine. When darkness falls the chlorophyll no longer acts, and a reverse process, as it may be called without much departure from absolute fact, sets in, and carbon dioxide is exhaled, just as we exhale it in respiration. The gas is heavier than air and highly soluble in water, hence night rains and dews in a forest are able to gather a much higher percentage of the gas, than rain falling in open country ; and it is this extra supply that gave the chemical forces the advantage over the mechanical, in old forest days, which resulted in the accumulation of the decomposed granite. The matted roots of the trees also served to retain the soil.

A beautiful illustration of the destructive action of the drip of trees can be seen in the Happy Valley, where, about the year 1886, an alabaster monument was erected beneath the trees to the memory of C. A. Heltze. The acid-laden water has utterly destroyed the erection, and its fallen fragments are laid aside within the encircling rails, where one can see how every moulding has been eaten away till the stone has been fretted into picturesquely fantastic shapes. On the basement some of the dissolved lime is redeposited as a stalagmite.

Thus we see how beautifully interdependent are the forces of Nature, how nothing liveth unto itself, how what we call the balance of Nature is a state of unstable equilibrium, and that the wasting of the everlasting hills is to some extent dependent upon the soft, green, waxy, chlorophyll, whose action is stimulated by the sun.

Nor have we yet exhausted the story of decomposed granite. In it are found huge rounded masses of solid granite, which have led those unskilled in such problems to believe them to be boulders, and to propound theories of marine action, glacial action, volcanic action and what not, whereas they are simply the more compact portions of the original rock, which have resisted longest the insidious attack of the carbonated water. They stand like veterans in the graveyard of their friends, vigorous in old age from sheer strength of original constitution. It is this that causes them to be sought by quarrymen as the best of building stone, for they have won a character for strength and durability which even a Chinaman recognises, though he reads not the hand-writing in which that testimony is inscribed.

CHAPTER III.

IN THE GREAT LABORATORY.

The birth of granite—Microscopic cavities—Imprisoned gases and liquids—Liquid carbon dioxide—The birth-place of granite—Miles of rock removed—Granite and pumice—Crystalline rocks—Felstone—The island volcanic—What a volcano is—Story of a volcano—Fusiyama and Hongkong—Gem-making—Nature's laboratory—Diorite—Ovifak iron—Native metals—From death to life.

IF, as we have seen, the death and dissolution of granite be fraught with high interest, the story nevertheless yields in majesty to the history of its birth!

Miles deep in earth's bosom it was generated, slowly crystallising out mica and felspar from a liquid mass, and then filling the interspaces with quartz as it solidified, catching up and imprisoning in its pores samples of the gases and vapours that permeate those fiery depths. Each crystal bears within itself the record of enormous heat and pressure in tiny cavities that serve as gauges, registering the pressure under which they were formed.

Examine a thin section of granite under the microscope, and in the quartz will generally be found minute cavities like irregular bubbles, many of which contain gas or liquid, and sometimes microscopic crystals deposited from the enclosed fluid. Of such inclusions may be mentioned water, hydrocarbons allied to petroleum, and even our old acquaintance carbonic acid. But this latter is in an unfamiliar condition, for instead of being a transparent colourless gas, it is a limpid watery-looking fluid.

Now, to compress carbon dioxide into a liquid at all requires great pressure, even though it be cooled down to freezing point; and if it be warmed to blood-heat no mechanical device can affect the change, and if we so warm our granite slice we shall see the liquid pass, with a bubbling boiling action, into gas again. It is held fluid only because it was imprisoned under great compression, and how great that pressure must have been we can understand, when we remember the rock-magma was at a temperature high enough to melt quartz, a feat that with us requires the heat of the oxy-hydrogen blowpipe.

Very careful researches have shown us that granites have solidified at depths of from 30,000 to 80,000 feet; hence every bit of granite exposed at the surface has lain buried under at least five miles of rock, all of which has been worn away by the slow action of the weather, of rain and frost and river, and by the fretting of the sea. The mind is appalled in contemplating such marvellous changes and the time they involve. It by no means follows that our island once stood five miles high, towering aloft like the topmost peaks of Himalaya; indeed it is pretty certain it did not, but superincumbent rock-masses of equal thickness were removed during a process of slow upheaval.

Superficially there seems to be little in common with granite and pumice-stone; yet their chemical composition is identical; and if granite be melted and rapidly cooled it is possible to convert it into pumice; but by no artificial means can we reverse the process and convert pumice into granite, the forces of Nature's laboratory so far surpass our own. But if we cool melted granite or pumice at different rates we can form pumice, glass, or fine-grained stone; and, further, we can trace every gradation between the two rocks by observing them in the field. This gradation forms a series commencing with coarsely-crystalline granite formed deep down under great pressure, thence through finer-grained rocks showing quicker cooling and less pressure, through rocks with scattered crystals in a glassy matrix, into pure glass, and ending in the froth which solidifies as pumice. Generally speaking the texture of rocks such as we are dealing with depends upon the rate of cooling, the larger the crystals the slower the rate, and as a corollary the coarser the crystallisation the greater the depth of origin.

This conclusion must not be pushed too far, for it applies to individual beds as well as to kinds of rock, hence the central portions of rock-masses, which have cooled slower, are frequently coarser than those on the outside. Even in the granite of our island all varieties of aggregation, from very coarse to fine, can be seen, proving how variable was the changing pressure, &c., as the seething mass slowly cooled, or was pushed and heaved in different directions. But in all cases the crystals of granite are quite visible to the naked eye, and in this differ from the rocks we have now to consider.

In several parts of the island, notably in the Peak district, are masses and sheets of a curious rock that weathers white, in contradistinction to the ruddy colour of decomposing granite. This is a porphyry, and is geologically known as *felstone.* The white soil that results from its decomposition can be seen from afar on every little terrace-garden. On examining it the matrix shows no visible trace of crystallisation, unless it is seen in thin slices under the microscope, when it is found to consist of an intimate mixture of quartz and minute felspar crystals. It is often almost waxy-looking, and on weathered surfaces is white from the conversion of the felspar into kaolin, as before described. Scattered through it are isolated crystals of felspar and small blebs of quartz that give it a more or less speckled appearance.

This, then, is not one of the deep-formed rocks like granite, not a *plutonic* rock as geologists say, but one that has been formed near the surface, that has welled up through the granite and cooled above it—an *eruptive* rock—in fact *volcanic.* Hence our island is volcanic in a certain sense. Not that the shape of the hills has any connection with that of a volcano, but that somewhere hereabouts volcanic action has taken place.

A volcano is not a mountain: it is a hole in the ground: a hole through which molten rock has been forced up from below. Such a hole may or may not reach the surface. If it does not then the molten rock solidifies beneath the ground; if it does then what is popularly known as a volcano is formed, and a volcanic mountain is the *result* of a volcano, not its cause; it is the accumulated material that, falling round the orifice or crater, or flowing from it as lava, piles itself about the vent.

The mass of most volcanic mountains consists of comparatively loose fragmentary matter that has been flung into the air, and of this no trace remains in our island. Let us picture a volcano from its birth to its death. Miles deep (but not many) we come upon a mass of hot but solid granite, which grows pasty as we descend, until finally it is liquid with a few floating crystals of felspar in it. The rocks above give way under the strain of the imprisoned gases, and pasty granite and liquid rock well up through the fissure, cooling into granite in places. Finally the superincumbent mass gives way, and with a mighty rush out burst the pent-up gases and vapours, flinging high into the air fragments of shattered beds, and spray of liquid rocks, and an eruption commences. The ejectamenta gather round the orifice and a hill forms, while molten rock overflows in streams of lava, to swell the growing mass. These cool at various rates, and so from the same fluid pabulum are born rocks of different aspect, and texture, and mineral structure, but all of similar chemical composition. The eruption wanes, the rocks below, which have not found vent, cool and solidify; the volcano ceases to be active, and for years, may be ages, the cooling goes on, forming under ground all sorts of igneous rocks, with a general tendency to grow more coarsely crystalline from above downwards.

Rain and carbonated water begin to wear down the new mountain, first removing the looser material; then, more slowly but as unsparingly, attacking the compacter rocks, till in the course of ages only a wreck remains, and the inner structure of the volcano lies revealed, even the first-born granite being exposed, while felstones and other volcanic rocks cap the basement granite just as we see them in Hongkong. This is no fancy sketch, but the true interpretation of the mystic handwriting on the rocks that all may read who will. Take great Fusiyama and pare it down to the size of Hongkong, and it will be like it in every respect. From the volcanic remains in our neighbourhood it is certain the Hongkong volcano was not inferior to the mountain-pride of Japan. But whereas that cone stands perfect in its youth, ours has been wrecked by time.

Imagine for a moment what possibilities of chemical manipulation exist in a volcanic laboratory. Titanic forces wield its pressure-engines, inconceivable heat takes the place of our puny furnaces, unlimited time is at command for experiment. What wonder then that here Almighty power fashions gems, turning the carbon of carbonic acid into diamond, the alumina of felspar into ruby and sapphire, the quartz into topaz and amythyst.

This meagre sketch only recites some of the interesting features of the volcanic history of our island, nor will space permit of much more being said, but a few words may be spared for the diorite, the "greenstone" that has been already alluded to. It is readily conceivable how, in a liquid mass such as exists beneath volcanic areas, the heavier portions would subside, and so be the last to be ejected, and that the activity of a volcano might be of such limited duration that these heavier materials would not overflow but only well up into the multitudinous cracks in the fissured rocks above. This has certainly happened in our island and in many places, as at Mt. Kellett and at West Point, the heavy diorite can be seen breaking through the granite and forming bosses. When this type of rock, which from its richness in soda and potash has a capability of fluidity far beyond that of the granite series, overflows it forms very liquid lavas that solidify as basalt and allied rock-types. These occur sparingly in the island, chiefly as dykes, or fissures filled with basaltic rock. But such rocks, and we have their representatives strongly marked in the diorites, lead us to even more fascinating reflections than the granite series.

They are rich in iron and so weather into deep rusty-looking masses—in fact they do rust. In some parts of the world where, as at Ovifak in Greenland, such abyss-formed rocks are exposed, they get more and more ferruginous until they become iron ores. Not only are such rocks rich in iron; they are as remarkable for being poor in oxygen, and at Ovifak we have metallic iron forming a large percentage of the rock, and even metallic masses of native iron, many tons in weight, that have been mistaken for meteorites, and thus of extra-terrestrial origin. Analogy and experience and geological investigation tend to show that as we descend below the surface we meet with heavier and heavier materials, till we are confronted with oxygenless metals, like iron, as distinct from the oxygenated metals like the alkalies and alkaline earths, such as soda, potash, lime, and alumina. If then, at a certain depth, our earth largely consists of metallic iron with nickel, what wonder it possesses such strongly magnetic properties: and if this be a true interpretation (as facts at present point) then our diorities or greenstones link us not only with earth's centre, but to that mysterious polar display of magnetic excitation, the aurora. Hence too we can understand why metallic lodes are so intimately connected with regions of volcanic force, and why, as a rule, gold, for instance, is entirely confined to places where such igneous activity has been rife. If it be asked has our island any such proofs of connection with deep-seated action, it can only be replied that we have found garnet, topaz and amethyst as gems, gold, silver, tin, lead, molybdenum, zinc, copper, iron and other metals as proofs of the reasonableness of the statements herein made; statements, be it remembered, not the product of the fertile fancy of the writer, but the common property of all geologists.

Gladly would we write more on this question of our island's origin, but so much yet remains to be made out that this is but an outline sketch, and one can promise any geologist an open field for research, full of interest, full of pleasure.

We have traced our granite from its birth to its destruction. We have seen how clays and sands are formed from its decomposition. We have shown how in the course of geologic change, the rocks are ever moving up or down; how the granite was once miles below the surface. Is there any reason why in the far future the clays and sands of granitic decay should not be plunged so low beneath the surface. Geology emphatically answers No! And if so from those disintegrated remnants may arise new granites, as new heroes rose from the dry bones in the vale, and thus proclaim not only that in the midst of life we are in death, but the more glorious gospel that in the midst of death we are in life.

CHAPTER IV.

THE CLOTHING OF THE ISLAND.

The privilege of island life—Plant waifs—Plants of tropical Asia—Plants of S. China—Himalayan plants—Malay plants—Plants of the Pacific—Our plant census—Northern stragglers—Hongkong and Shanghai—Peak violets—Island natives—Violets and primroses—The tide of life—Plant destroyers—A lost rhododendron.

IT is a privilege to live upon an island if one has any love for nature. It doubles our field of observation, for one thing, by adding the sea and its treasures to those of the land, and the sea moreover stamps the shore with its own seal far above where the salt spray reaches. Most of all is it a privilege to live upon a mountainous island such as ours, for in such a spot all the higher problems of life are brought home to us with accentuated force. All who wish to see what a treasure-house such a place is should study Mr. A. R. Wallace's book, whose title, "Island Life," should tempt us strongly.

The stray plants we dealt with in our first chapter proclaim one great fact—that our island has been connected with tropical America in some way. The presence of the sensitive plant, *lantana* and *asclepias*, tell us as certainly that some connection existed between the West Indies and Hongkong as "our own regiment" proves a connection with Afghanistan, or our own presence forms a link with England.

In all these cases we know what the connection is—the ships of our own and other nations.

In precisely the same way the plants and animals of our island, when their story is elicited, tell us of former connections with other lands, long before we, or perhaps any human being, arrived upon the scene. If we take the plants alone, of which over a thousand and seventy are known as indigenous, we see at once that our island belongs primarily to tropical Asia, some 40 per cent of the species ranging all over that great area, including the Archipelago, and many extending their range into the Pacific islands. This is what we should expect: these are the true indigines; and when we find further that some 19 per cent in addition are unknown out of S. China, we feel that we have really got a firm hold upon the character of the plants of our island. But in science the minority has it claims as clearly recognised as the majority. What then shall we say of that great minority still unaccounted for? First we will, for the moment, omit all notice of 16 per cent consisting of plants hitherto unknown outside our island; not being found, for instance, even in Kowloon only a mile distant.

There remain 25 per cent, exactly one fourth of the whole, which are not members of the floras of tropical Asia, China, or Hongkong. Of these 12 per cent of the total flora, or one half of this residual flora, as we may call it, are characteristic forms in the steaming, rainy regions of Khasia and Assam, whence they may be followed along the western slopes of the Himalayas, creeping southwards along the central range of the peninsula, but not reaching Lower

India or the Archipelago; eastwards the flora extends along the mountains of China; and, while sending a large contingent to our island, it fades away northwards till in Manchuria hardly a trace can be found. Of this group we may cite the little milkworts *(Polygala)* of which, curiously, Hongkong and England each possess three species. The vines *(Vitis)* of which we have eight species, are another example.

Seven per cent of the total flora are offshoots from the Malay archipelago; plants which reach northwards to eastern Bengal and Ceylon, but do not enter central India, though some inhabit tropical Africa, and many cross by the Pacific Islands to N.E. Australia. Of this flora we may cite *Uvaria.*

Five per cent of the total flora belongs to a type flourishing in the Archipelago and Pacific, but absent from India, such as *Brucea.* Finally, of the plants of temperate Asia and Japan, only one per cent is represented in our flora, so completely are we cut off from the North.

Collecting these results we have:—

I.	Flora of Tropical Asia	40	°/₀	species	425
II.	,, ,, Southern China	19	,,	,,	202
III.	Endemic Flora	16	,,	,,	173
IV.	Flora of N.E. India	12	,,	,,	126
V.	,, ,, S.E. India	7	,,	,,	76
VI.	,, ,, the Archipelago and Pacific	5	,,	,,	58
VII.	,, ,, Temperate Asia	1	,,	,,	12
	Total	100			1072

Four points come out clearly from this analysis, and though the flora of S. China is not known as thoroughly as one could wish, it is improbable that the relative values above given will require much future modification. First, we see that our flora is essentially a tropical one, second that S. China has a distinctive flora of its own, third that a very marked connection exists between our flora and that of the lower slopes of the Himalayas, and lastly that we are almost completely cut off from the temperate flora of N. China and temperate Asia generally.

This last fact is of very high value, both in determining the source or origin of our flora, and in connection with the story of the growth of the continent of Asia in recent geologic times, and the question of the prevalence of glacial conditions of great intensity in these longitudes contemporaneous with the glacial period of Europe and N. E. America.

On arriving in Hongkong the visitor from Europe is at once struck with the absence of certain well-known types of vegetation: the daisy and buttercup and dandelion are gone, the violets and docks and umbellifers like fools-parsley are not to be seen. But if we go northwards, say to Shanghai, these familiar forms re-appear, some identical with the home plants, others closely allied or "representative" species, mixed even there with forms, such as the bamboo, unfamiliar to English eyes. After spending some years in the heart of the tropics it is almost like going home to wander over the flats of Wusung and gather celandine and violet and shepherd's-purse and other plants of happy memory.

Yet something of this can be experienced in our island. On the hills of the Peak district violets remind us of spring time in boyhood, and though none of the species are absolutely identical with our own, one is of pure boreal type and goes North into snowy Siberia, one is a "representative" species that in Sikkim and Khasia tells of a former floral union with the North, and one is peculiar to our island, a sort of very close relation—a brotherhood rather than a cousinship—of one of the commonest violets in the old country.

How came these strangers here? They are true natives: man has not brought them in his trail, and the solution of this problem belongs to the great question of the origin of the present flora, and is connected with all the geological changes of the recent, though humanly speaking antique, period.

Equally wonderful is the fact that our island possesses so many plants peculiar to itself. No fewer than 173 species, or 16 per cent of the whole flora, are utterly unknown elsewhere, even on the islands visible to us close by, such as Lantao. It may be said this is owing to a better knowledge of our island than of the others, and to some extent this is true; but as we get to know the mainland and neighbouring islands better, though some species supposed to be endemic, are found to have a wider range than was known before, the great fact is more and more emphasized that each island, or group of islands, really has its own types of life, which do not occur elsewhere. This is one of the most fascinating peculiarities of island life. Islands have often been so long separated from their parent continents (some of course were always isolated) that, on the one hand, the fierce struggle for life has passed them by, and so left types that elsewhere have fallen in the battle; and on the other hand, new forms have arisen, determined by the peculiarities of the situation.

Look at our violets, for instance. Why has the hairy violet (*Viola hirta*) of Europe, here become smaller, less hairy, and with the lower leaves nearly circular? Why have so many violets, like those of our island, continued to produce the loveliest of flowers, but almost lost the functional use of flowers—the production of seed; and instead grow seed in insignificant, uncoloured flowers, later in the season, which have no attraction for the eye of man or insect, in violation, it would almost seem, of the laws of plant life? To these questions we can, as yet, give but incomplete answers, but in our island we can study them, unless we are content to be like Peter Bell with the primrose. We have, by the way, no primroses here, but on plains and hills lingers a solitary species of the order (*Lysimachia alpestris*), representative of that northern flora we have been speaking about.

The tide of life seems always to have flowed southwards. Just as southern Europe was overwhelmed and stocked with the northern hordes from Asia, just as China and India, and later America have been similarly invaded; so a stream of plant life has set southerly, until from Scandinavia to the Cape, from Labrador to the Horn, from Siberia to New Zealand, the same, or representative species, have passed southwards. The mountain-ranges were the lines of route, changing climate the inciting cause, winds in many cases the carriers, lost lands the points of call.

The wide spread continuity of northern land favoured the development of species, and, by intensifying the struggle for existence, gave that vigour to the constitution which made colonisation easy. Hence, too, we understand why, these causes not obtaining in the South, there has been no commensurate floral tide northwards, though a feeble current has wandered in this direction, leaving small colonies in Borneo, the Philippines and China, including our favoured island, which we see again takes its place as a factor in the great scheme of the world's history.

The botanical history of South China will always be indebted to our island; for, if one had to characterize the Chinese, it would be not inapt to term them the plant-destroyers. Living in a land possessing the finest coal-fields in the world—unless our American cousins demur to such a statement—being the first people to utilise coal as fuel, as Marco Polo the accurate, points out—they have been so utterly negligent of their resources, that every scrap of wood and herb is taken for fuel, though coal should be so cheap; and native carelessness starts grass-fires, by which so many interesting species are killed off. Even within the last two months an unique *Rhododendron* was destroyed in Lantao. But our island has never had a large human population; hence its flora is so rich, and we may point with pride to nearly 1,100 species on an island of only twenty-nine square miles, a record it would be hard to beat, and it is not exhausted yet, for there is still plenty of work for our young people even in the discovery of new species.

CHAPTER V.

THE WAVE OF LIFE.

The stream of life—A glacial sketch—Mountains the islands of the land—Absence of glaciation from China—The messenger winds—N. China a new land—The pedigree of our plants—Fossil plants—Cinnamon—Club-moss—Stanley graveyard—A historic parallel—Ferns—Trees and their antiquity—Origin of the China-America flora.

A STREAM of plant life, and an important one, has undoubtedly set southwards, and has reached the distant shores of New Zealand and Tierra del Fuego, lapping our island in its course, and leaving as it were a spray of species to attest its existence. But when we come to analyse the one per cent, the twelve isolated species, and ask how came they here, what brought these plants from their original home and stranded them on the tops of our hills, the answer is not an easy one, probably not a simple one, certainly not a complete one.

When in the earlier half of this century it began to dawn upon geologists, that Northern Europe and North-eastern America had passed but recently through a cold phase—the glacial epoch—an answer to the question was soon forthcoming, and for long seemed a sufficient one. Picture a country growing steadily colder; its plants and animals as steadily compelled to spread southwards from stress of weather, or to die. The alpine forms, no longer deriving even the scant warmth they need, are literally pushed down the hill-sides on to the plains; and thence towards more genial lands to the southward, they flee before the advancing cold, a slow moving but irresistible phalanx, a mighty migration taking thousands of years to move hundreds of miles; but yet a ceaseless march that in time alters the whole aspect of the land. Where once dwarf-willows and birch held their own on the chill mountains, perpetual snow now reigns, and these lowly diminutive trees occupy the ground where erst-while tall forests grew, as we may see to this day in the cliffs of Norfolk. Then comes a change; and as slowly as it drew on, the cold epoch dies away, and arctic and temperate plants find themselves crowded from the South by the returning hosts they had driven before them; until, finally, the plains becoming too warm for them, some are driven to the cool uplands, finding an Ararat in every mountain, a refuge from the flood of sunshine, while the main body retreats to its pristine home. In this way the mountain heights were peopled with a foreign race, just as the mountains of Sumatra are tenanted by the wild tribes of Bataks, who have been driven upwards by the waves of Malay immigration. Hence, too, even isolated mountains might receive strange colonists, plants which once occupied the intervening plains, but are now left stranded—waifs from a floral sea, cast up on the hills as on islands—for, as Darwin long ago saw, mountains are the islands of the land.

So far all seems plain and easy, and one is almost entitled to say that such must have been the course of events in a glaciated region; and as the whole of the northern parts of both new and old worlds were considered to show evidence of glaciation, the explanation seemed as complete as it was philosophical. But with more exact knowledge it began to appear that only some of the facts could thus be explained. For instance, there are in Tierra del Fuego about fifty flowering plants that are of North American or European species, but are not known in any intermediate country. Had these exiles arrived overland, as suggested, they must be the survivors of an invading host that would have swept away every tropical plant and animal in America; the vast forests of the Amazons must have gone down before it as the Incas fell before Pizarro. And so of other regions: had the tropic plains been cooled to let the buttercups pass over them, it follows that every living tropical animal and plant has been evolved since the glacial period: and we know from geology, and from other sources, that this is not so.*

But if as the Psalmist puts it "He maketh the winds His messengers," there is no need to ask of the glacial epoch more than it can accomplish. In the upper regions of the air, where the unchecked winds blow steadily, small seeds may be occasionally carried, and fall upon scarred, bare, mountain surfaces, and springing up for awhile, send out new messengers to more distant peaks; and so, the mountains being their stepping stones, traverse the earth from pole to pole. We know many plants do make temporary stopping places; we know that, as in Shanghai in 1856, the air seemed full of white fog from floating willow seeds, the cause suggested is a real one; we know too that unlimited time is practically at command, and hence we are justified in concluding that this suggestion of Mr. Wallace's is one of the causes of the dispersal of species. Wallace points out that the plants in question have small or winged seeds, or have other facilities for wind-carriage.

---

* I cannot think with Belt and Wallace that tropical forms found refuge in low lands, now submerged, which fringed the present continents. The area so available seems too small.

Add, further, to this the fact that is coming more and more strongly to the fore, that China certainly never was glaciated in the sense that Europe was, and we may conclude with high probability that the northern plants of our island have come to us on the wings of the wind, and have never, as Dante has it, "climbed with heart of proof the adverse steep" of our hillsides.

As if to add conviction to probability, it is beginning to appear that about the time that Europe was in the grasp of the ice-fiend, there was no North China at all for the plants to march over, but that from a muddy sea there rose an archipelago of what are now mountain systems—that the resting places for seeds or growing plants were far fewer than now—and that this isolation of our island is the reason why our mountains are less rich in northern forms than the mountains of Ceylon.

A nation without a history may be blessed, as the epigram maker tells us, but it is uninteresting; happily the flora of our island is not in this stale and unprofitable condition, for its history leads us back into the early childhood of the world, and tells of a connection with Europe compared with which Marco Polo's is but as a traveller by the last mail; and of a link with America ages before Columbus, or indeed the human race was born. We must seek the pedigree of our plants in the rocks where, buried in the muds of old marshes, lakes, and estuaries, or sealed beneath the ashes of volcanic eruptions, their remains are entombed, often in such perfection that wood and leaf and and flower and fruit, nay even the minute fungi that eat into their substance, are preserved to us with a perfection that is profoundly wonderful. Such plant-bearing rocks do not, it is true, occur on our island, but to trace the history of plant or animal one must gather evidence from afar, or we shall fall into error, just as old naturalists did when they named an American bird the *Turkey*.

There are at present described about 146,000 living plants, but as yet only about 9,500 fossil plants have been discovered; and, as we have every reason to believe the land has never been less draped with herbage than now, the incompleteness of our knowledge of the floras of the untold ages of the past is brought forcibly home to us by these figures. Yet we must not mistake incompleteness for inexactness: the finding of early British coins with a design copied from the Macedonian Philippus proves a connection between our early ancestors and Greece as certainly as if we had a contemporary account of the mintage; and, in like manner, the discovery of cinnamon leaves and flowers in the rocks of Switzerland and England, not unlike one of our island forms, is a certain proof of some original connection between the two countries.

Let us then glance at the life-history of some of our plants. Take these exquisitely beautiful trailing club-mosses (*Lycopodium*), that may be found in any damp place. They remind one of miniature spruce firs in their sharp-pointed scaly leaves, more or less closely applied to the stems; nor is this outward semblance an accidental one, for they are actually allied to the conifers, as they are in other respects to ferns and mosses, and indeed form one of the numerous "connecting links" between those orders, links which some people ask evolutionists to find, not knowing they are plentiful enough as it is. They are in some sense ancestors of the pines, and ante-date them in geological history, first appearing low down in the Silurian rocks, the true conifers first showing higher up in the same ancient formation. Very old denizens of our globe, these club-mosses appeal to us as survivors of the forest trees, the giants of the woods of the carboniferous, or true coal age. Diminutive as they now are their ancestors stood twenty and thirty feet high, towering above the ferns and horse-tails that with them formed the bulk of the vegetation whose remains are now converted into coal.

What memories are evoked by the contemplation of such a plant! The longest pedigree of the oldest noble house is but a bubble's life compared with that of this lowly plant, which has watched the growth of every continent, peopled each new land as it rose above the waves, has seen the origin of nearly all our mountains, and was in full vigour even before the first mammal was evolved!

At the little settlement of Stanley there may be seen the tombs of the pioneers of our island, looking sere and hoary and venerable, though half a century has scarce passed since the soil filled the new graves. Yet these are the antiquities of our island! In an English village one looks with awe upon the round arches and chevron mouldings of the Norman period; and the rare long-and-short work of Saxon towers, like Earl's Barton, seem even more dim in the twilight of history. May be, as at Lincoln, one comes across a fragment of Roman masonry, and we treat it with reverence, and out on the wolds stand the tumuli of earlier races still. How vivid is the page of history in these time-hallowed presences! But suppose, on one's passage to our island, the voyager halts at Marseilles, and sees the touch of the vanished hand of the Phœnician—antiquity doubles itself—then pass on to Egypt and look upon her dead glories! Phœnician and Roman become modern by contrast, the ring of the Crusader's steel seems but dying on the breeze. Yet how incomparably modern are these antiquities compared with the record of our tiny club-moss. It is these reflections that give such a zest to the study of our island home.

If we liken, as we may fitly do, the club-moss to the old Egyptian, then the ferns and lowlier forms of vegetable life may be compared to that early pre-historic record of our race whose relics come to us in the stone implements of Europe, Asia and America; tokens of the dawn of human story that have been found even in China—China the modern, for it is very modern in spite of the pseudo-history that has clothed it with a spurious antiquity—and tokens that may yet turn up in Hongkong.

Our trees and higher forms of vegetable life would on such an historical parallel rank with the Roman period, as they first appear in the middle Cretaceous period—that is, before the chalk of the white cliffs of Albion was laid down, though they must have been denizens of the land long before this. Could we be taken back in time to the old forest scenes where these earliest known trees were flourishing one would hardly realise the change, for strange to say, the eye would gaze upon familiar figs, laurels, sassafras, persimmon, maple, walnut, magnolia, and even the apple and plum.

Higher still in the historical scheme—in the Miocene, the Norman period as it were—we should find in Europe plants closely allied to those of our island, cinnamon, cassia, liquidamber, and other well-known plants flourished; and, stranger still, they were mixed with common American types, like the Sequoias, or "big trees," the swamp-cypress, the fan-palms and tulip trees. Indeed at this time there was a strange commingling in Europe of forms now living in N.E. America on the one hand and N. China and Japan on the other.

Just as our island missed much of the cold-wave plants, so it lies a little South of the district that, North of the Yangtsze, still has such an American flora, derived from Miocene times. While it shows an affinity to old types, our flora has nevertheless a strong character of its own; and here, better than most places in S. China, can be seen the indigenous vegetation, which elsewhere has so largely been annihilated by the plant-destroying Chinaman.

In this rapid and meagre sketch of the plants of our island sufficient surely has been said to show how fascinating a study is that of our floral population.

CHAPTER VI.

THE PEOPLING OF THE ISLAND.

Our butterflies—Mr. J. J. Walker, R.N.—Euplœas and whites—Fearless and shy butterflies—Variable vital force—Like grandfather, like child—Difficult species—Seasonal varieties—Value of butterflies to science—Mimicking butterflies—A new case—Protective resemblance—Range of our butterflies—The Red Admiral—Local species—Hongkong butterfly gems—The Happy Valley—Butterfly pedigree.

MOST of us in our schooldays were enthusiasts in butterflies, and still recall the excitement of the first capture of a Painted Lady, and the feverish hope that one day a Camberwell Beauty or even a Bath White would fall to our net. Hence, while newcomers sometimes feel a shade of disappointment that all the flower-glories of the tropic do not meet their eyes on landing, the beauty of our butterflies at once attracts attention. Hence we select these insects to illustrate the fauna, though birds or other orders would equally have served our end.

Knowing of no published list of Hongkong butterflies, the writer has to fall back upon his own experience, ably supported by J. J. Walker, F.L.S., of *H.M.S.* "*Penguin*," whose entomological zeal has earned him throughout the navy a sobriquet as objectionable to English housewives, as it is innocuous to American ears. Together we can reckon up about a hundred species, and lest any young naturalist think we have exhausted the roll, let me record that within a few hours of writing this, comes the report of a conspicuous species having been seen, but not captured, that is new to the colony.

First to attract attention, both as being so different from home-forms and because it is sure to be seen in the earliest ramble, is the exquisite genus *Euplœa*; large, dark butterflies with a magnificent royal-purple blush that equals the glow of the Purple Emperor at home. They fly slowly, and often flutter in crowds round a bush, so regardless of danger, so ignorant of the existence of foes, that they can often be picked up in the fingers as they sit lazily sipping the nectar from the brilliant scarlet Poinsettias or the pink blossoms of Melastoma. Flitting about over all the undershrubs will be found white butterflies (*Pieris*), that remind one of our first captures at home. Try and get near one. No chance there of picking up a specimen with one's fingers: they are off at once, startled with the least motion. And here we get a clue to one of the crucial points in the history of these winged treatises on evolution. No living creature can teach us as much with such small trouble as a butterfly! Not by sticking pins in his dead body and cataloguing him, but by watching his habits: by trying to learn if he finds life worth living, and why; can we glimpse the mysteries of organic life. Catch a *Euplœa* and a *Pieris* and give them the orthodox pinch on the thorax. They lie apparently dead, and the white one really is so, but the chances are ten to one the dark butterfly is only foxing, and will be off at the first opportunity carrying a gilt pin stuck through him with as little apparent pain as a hair-pin in a lady's back hair. One might almost divide butterflies into shy and fearless classes, and the latter would be found to possess extraordinary vitality.

This difference in vital power is a very curious phenomenon: it looks almost as if some creatures had more life, more vital force, than others. You can dismember a crocodile or an ant-eater without killing it—I have known a crocodile walk about after heart and viscera were removed. How different too are the cat's proverbial nine lives from the dog's powers in this way! Here is a subject on which we know hardly anything, and which may be studied in insects without cruelty.

The common experience that children resemble their parents receives a rude shock when we study butterflies. Some do not obey this law of heredity in its strict simplicity, and a collection of the lovely blue, red-spotted *Junonia andromeda*, that is so common in grassy spots, shows that the autumnal and spring broods differ greatly in their ornamentation. Here children resemble their grandparents and not their immediate progenitors. The same fact can be studied in the brown *Melanitis leda*, that flits about in the twilight all the year round; and the pretty, bright yellow *Terias*, that glitters like a flake of gold in the sunshine, is so variable that to this day much difference of opinion exists as to what constitutes a real species in this genus. We seem certainly to have three distinct species here, but the truth will only come out when numbers have been bred, and here is another point our younger naturalists might take up with the certainty of making valuable discoveries.

The difference in the seasonal broods has been thought to be one of the stages in the formation of new species—that we here see new forms in the process of manufacture. Certain European butterflies (*Araschnia*), allied to our Junonias, have a winter and summer form so distinct as to have been confidently described as separate species till they were bred from the same batch of eggs. Now, wonderful to relate, if the summer-form pupae are cooled down to a low temperature, they change into the winter form, but no manipulation can reverse the process—the winter form is the more stable. It has been thought the summer form is a newer variety dating from the glacial period; but this would not apply to the insects of our island, and once more we find butterflies affording us ample scope for elucidating some of the most important and interesting problems in the history of life.

The delicate membranes of a butterfly's wing, as Bates long ago pointed out, with its complex covering of scales, is a page on which Nature records with ease the changes in the world's history. Let me quote my dead friend's eloquent tribute to his favourite insects :—

"No description can convey an adequate notion of the beauty and diversity in form and colour of this class of insects .... I paid especial attention to them, having found that this tribe was better adapted than almost any other group of animals or plants, to furnish facts in illustration of the modifications which all species undergo in nature under changed local conditions. This accidental superiority is owing partly to the simplicity and distinctness of the specific characters of the insects, and partly to the facility with which very copious series of specimens can be collected and placed side by side for comparison. The distinctness of the specific characters is due probably to the fact that all the superficial signs of change in the organism are exaggerated and made unusually plain by affecting the framework, shape, and colour of the wings, which, as many anatomists believe, are magnified extensions of the skin around the breathing orifices of the thorax of the insects. These expansions are clothed with minute feathers or scales, coloured in regular patterns, which vary in accordance with the slightest change in the conditions to which the species are exposed. It may be said, therefore, that on these expanded membranes nature writes, as on a tablet, the story of the modifications of species, so truly do all changes of the organisation register themselves thereon. Moreover the same colour-patterns of the wings generally show, with great regularity, the degrees of blood relationship of the species. As the laws of nature must be the same for all beings, the conclusions furnished by this group of insects must be applicable to the whole organic world, therefore the study of butterflies—creatures selected as the type of airiness and frivolity—instead of being despised, will some day be valued as one of the most important branches of biological science."

It was among butterflies allied to our *Euplœas* that Bates discovered the wonderful phenomena of mimicry, in which a rare insect assumes the colouring and habits of a commoner species with which it associates. This has been explained as the means adopted by edible forms to avoid the attacks of enemies. Much, however, remains to be done before this question is settled, and the writer has insisted upon the fact that butterflies on the wing have practically no enemies, whatever may have been the case formerly. He suggests that we have in mimicry a survival of a time when insectivorous birds did prey upon butterflies—a habit they seem to have almost completely lost. Any observation on butterflies' enemies is of extreme interest.

We have in Hongkong what seems to be a hitherto unnoticed case of mimicry. The very fine black and pale green *Hestina assimilis*, peculiar to S. China, puts on the garb of the common *Danais grammica* and *D. similis*, which insects are also copied by *Papilio dissimilis*.* The very names show how much alike the insects are although they really belong to three distinct families, that are quite as different from each other as cows from sheep, and more so than sheep from goats.

The allied phenomenon of protective resemblance that has its finest examples in the leaf-butterflies (*Kallima*, not known in China) may be well studied in our island, for, with the exception of *Danais* and *Papilio* (swallow-tails), pretty well every one of our species is, on the under-surface, coloured to resemble the surroundings of its resting place. Thus the great orange-tipped white butterfly *Hebomoia glaucippe*, when sipping water on damp sand, is quite indistinguishable when its wings are closed.

When we come to look into the origin of our butterfly fauna we are struck with the fact that it is essentially tropical, and has practically no trace of a northern connection. Many of our butterflies go northwards from our region, such as the glorious green-gold and black swallow-tails *Papilio Paris* and *Bianor*, which flit about Pekin as commonly as about Hongkong. But the northern forms do not come down here; and we have no representatives, for instance, of such species as the pale yellow *Colias hyale*, which is so common in Chusan, Shanghai, and further North. If any butterfly has a trace of northern origin it is *Vanessa indica*, which is so closely allied to *V. atalanta*, the "Red Admiral" of our school-days, that at first sight it might be easily mistaken for it. Closer acquaintance shows it to be quite distinct, the crimson bar of its fore-wings is not so sharply defined, and the under-surfaces of the hind-wings, which in the home insect are decorated with a rich bewildering mottling of browns and purples, is here much more evenly coloured. *V. indica* extends North as far as Madeira, but does not reach England. On this side of the world we are near its southern limit as it is absent from the Philippines, and it grows more plentiful as we go northwards. This range, and a tendency to prefer the hill-tops, gives it some title to be considered the most northern species we have.*

---

* Wallace notices a similar case of three other species of these same genera, viz: *Hestina nama*, *Danais tytia* and *Papilio agestor*, in the Himalayas.

Some of our butterflies are very local. Thus most of the year, may be seen flying about the roads, even in the city, the rich yellow-brown, slow moving, *Clerome eumæus*, peculiar to S. China, and as yet hardly known in home collections, though it is so common here. Little dusky bush-haunting insects of the genus *Gerydus* are confined to certain favoured spots, often less than an acre in extent, and one, *G. chinensis*, has its only known locality in the Happy Valley. The Happy Valley is the butterflies' paradise, and there may the great orange-tipped *Hebomoia* be lured by a paper counterfeit, or if one is fortunate the long-tailed transparent *Leptocircus*, almost dragon-fly-like in its flight, may be seen sipping nectar from a favourite flower. Magnificent purple and blue-glossed *Theclas* affect the trees, and the rich tawny and black *Symbrenthia* with its shining green eye dot is often common in the side-walks. Indeed in this favoured spot, with scarce an exception, every species of our butterfly fauna congregates.

---

* *Argynnis niphe*, is an example of a tropical form of a temperate genus.

Occasionally one sees, as last autumn, that inexplicable phenomenon, a migratory flight of butterflies, and heavy-flying dark *Euplœas* travel steadily southwards from the mainland to our island, and so out to sea, from what deep-seated impulse one cannot as yet determine.

Finally one would remind the reader that these "winged flowers" are very ancient denizens of the world, and though more fragile than tissue-paper, their remains are found embedded in the rocks. Representatives of existing genera, such as *Vanessa*, occur in early Tertiary beds, and some in far older rocks, down in what one may call Earth's Roman period. How it comes about that such highly-specialised and delicate forms are of such colossal antiquity, and have survived mighty revolutions which have raised old sea-beds three miles high, elevated mountain chains, and sunk old lands beneath the waves, we do not know; but it teaches us to read into the poet's words "a thing of beauty is a joy for ever" quite a new meaning.

CHAPTER VII.

THE SCULPTURING OF THE ISLAND.

The instability of the land—Time gauges—The geology of the poets—Old sea-beds—Antiquity of oceans—Asia's real coast-line—Lost lands—How our island was severed from the mainland—Effects of a slight depression—The age of Formosa—The island never submerged since early geological times—St. John's Monkey—Our special butterfly—*Homo ligniperdus* again—The carving of the hills—Heavy rainfall—What the river-sediment reveals—Regeneration—Finis.

WE started with the statement that it was a privilege to live upon an island, and though to some extent that proposition has been made good, it remains to establish the fact by showing how we became an island, and what the result of that insularity is.

The fundamental fact of geology is the instability of the land. Our chart-makers and engineers cut deep marks in the rocks to show permanently the datum-line above sea-level, yet it is hardly putting the case too strongly to say that over 90 per cent of such marks are engraved upon rocks that are moving upwards or downwards. Sometimes the movement is rapid, as when earthquakes seem to shake earth's very foundations; generally the action is slow, long-continued, and to us imperceptible. Our time-measures depend upon the length of our lives. Did we live but a season, like the butterflies, we should not speak of years; had we the span of life of the tortoise, years would seem too short for standards. But suppose our lives were commensurate with the earth's age, what changes we should be conscious of! No poet then would have sung "the everlasting hills" for he would have seen them form and pass away, nor would a Byron have written of the ocean "boundless, endless, and sublime—the image of Eternity" for he would have witnessed broad lands, like Asia, rise where once the green waters spread. Yet still might our last, lost, loved laureate have penned immortal "In Memoriam" and kept the stanza—

> There rolls the deep where grew the tree,
> O earth, what changes hast thou seen!
> There where the long street roars, hath been
> The stillness of the central sea.
>
> The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mist, the solid lands,
> Like clouds they shape themselves and go.

but there would be recorded this on his proof sheets:—

"Line 4, stanza 1, for 'central sea' read"——

[but no, I dare not make the alteration].

It is becoming more and more apparent that the "central sea" is the one immutable thing, and that though all the land has been under water, ocean's abysses have not been land.

When we find, as in central Asia, old sea-bottoms elevated three miles above sea-level, one may be excused for thinking that such great changes warrant us in believing sea and land may alternate in any part of the globe. But this deduction is misleading; it ignores the great relative bulk of sea and land, and the important fact that has only been discovered of late years that not only have we no trace of upheaved deep-sea deposits, but that all our stratified rocks are of comparatively shallow-water origin. We now know that the detritus carried down by rivers is deposited near shore, hardly any getting 200 miles out to sea. Hence we conclude that though the continents have varied in extent, sometimes extending where now the sea lies, and at other times being much reduced in size by depression below the waters, yet that, viewed on a large scale, continental areas have always been more or less land areas, and that the depths of the ocean have always been covered with water.

Still we may readily admit that any part of the sea down to the 1,000 fathom level may have been land, and if we draw a line round the coast of Asia at that limit we shall enclose all the islands from the point of Kamchatka, Japan, the Philippines, the Archipelago and Australia. Moreover this line runs very closely along the line of the Kurile, Japanese, Liu Kiu, and Philippine Islands, to the immediate east of which there is always deep sea, which seems to mark a real boundary of the land. This line for the greater part of its course is one of modern volcanic action, and this as we have seen indicates a line of weakness, of fissures. Hence we may be pretty sure it marks the limit of the still-growing continent of Asia.

All within this limit may be and probably has been land; not all at one time, for elevation and depression are often of quite local occurrence. The point here to be made is that in these alternations of land and sea, we have that physical connection between islands and other lands now separated that will account for the intermingling of the forms of animal and vegetable life that we have seen to obtain on our island.

The mass of the great continent of Asia is of very recent origin, and (probably with the human era) all North China, except the mountains, has been under the sea. At that time our island stood as land, and was even then probably separated from the mainland. When it was actually separated we cannot yet exactly say, but it seems to have been due to a general depression of the coast, which need not have been of great extent, for if the coast were again elevated 600 feet, or even as much as the height of the Bowen Road above the Praya, the whole of the Yellow Sea would be laid dry, and Hainan, Formosa and Japan joined to us. But the depression was not so widespread as that, and long before Hongkong was separated from China, Formosa stood as an island, as is shown by the distinctness of its animals and plants, for strange to say they are more closely allied to the denizens of the Himalayas, S. India, the Malay islands and Japan, than to those of the adjacent coast of China.

Our island shows no trace of having been submerged since remote (say Silurian) geological times, and though its severance from China may have taken place as late as the Tertiary period, it is as an island newer than Formosa or Hainan.

When it was insulated we cannot exactly say, but if we judge by analogy from the adjacent Ladrone islands it was long enough ago to admit of the evolution of a distinct pig-tailed rock monkey *(Macacus sancti-johannis)*, whose dried bodies may be seen in Chinese medicine shops. We have one little, dusky, thick-legged, butterfly peculiar to Hongkong (*Gerydus chinensis*), and other peculiar insects are pretty certain to be found. Among plants we have seen no less than 173 are not known from elsewhere, and these facts are the strongest possible evidence of the length of time our island has been separated from the mainland. It is true some of these plants may yet turn up in China, or may have lived there and been destroyed by that new species of man, *Homo ligniperdus*, who seems in derision to have called his country the Flowery Land. But when we consider that the British islands contain no less than 195 species unknown on the continent (of which 29 are plants), and that even Lundy Id. has its own peculiar form, we ought not to lay undue weight upon this argument. Our island, we may infer, has its own forms of life and these attest its antiquity.

Though subsidence has undoubtedly had much to do with the cutting off of our island from the mainland, yet we may be pretty sure that the wearing action *(denudation)* of rain and streams has largely assisted in the process, and is still reducing it to smaller limits. Our steep hill-sides and heavy rainfall (90 inches) the bulk of which falls in the five months May to September, are well fitted to produce great results. When, as in May 1889, exceptionally heavy rain falls, the action is very noticeable. Between the 17th and the 30th of that month no less than 48·470 inches fell, of which 20·493 were recorded in 16 hours on the latter date, 3·400 falling in one hour, or over 340 tons per acre of surface. Roads, bridges, dams, even the tramway failed to resist the force of the rushing waters, and for forty miles northward the sea was muddy with the waste of our hill-sides.

But even in ordinary seasons the waste is enormous. The great river Yangtsze pours daily into the Yellow Sea about twenty million cubic feet of sediment, whose colour gives the name to the sea, and every ounce of this has been worn from the face of the land. At this rate, and it must be remembered this is not an exceptional speed, the whole of the land would be worn down to sea-level in say three million years. No wonder then that miles of rock have been removed; the wonder is that any land has survived the ceaseless destruction; and indeed it could not were it not for the equally ceaseless process of gradual elevation.

It is to this denuding action we owe the peaked hills, the beautiful valleys, the narrow ridges that diversify the face of the island. Its fretted coastline is due to this and the gnawing action of the sea, and where the rocks are softest we find great indentations like Tytam Bay cutting deep into the land. With such colossal planing tools at work we may be sure that a time, not geologically far distant, may come when this island shall be reduced to a shoal awash at high water.

The material so removed forms the clays and sandstones of shallow sea-beds, and will by upheaval form new lands. The greater part of the earth's land surface is composed of such old sea-bottoms, all testifying to the action of rain and rivers, frost and snow. So the ceaseless round goes on: nothing is wasted: destruction necessitates construction.

A little reflection will show that all these sedimentary rocks are derived at first from the breaking down of igneous rocks, like those of which the island is built. If so, if as we know, such denuded matter may be buried miles deep, is it not possible that in the great laboratory those materials may be worked afresh into granite, be brought to the surface again, and so repeat the metamorphic cycle? Some geologists think it even probable. And so we are brought back to the point we started from, and the poet's aspiration as to man applies to nature also—

> I held it truth with him who sings
> To one clear harp in divers tones,
> That men may rise on stepping-stones
> Of their dead selves to higher things.

RHOPALOCERA HONGKONGENSIS

(A PRELIMINARY LIST OF THE BUTTERFLIES OF HONGKONG)

WITH NOTES

BY

SYDNEY B. J. SKERTCHLY, F.G.S., M.A.I., &C.

AND

J. J. WALKER, R.N., F.L.S., F.E.S.,

RHOPALOCERA HONGKONGENSIS.

The following list embraces all the species of butterflies known to the authors as occurring in Hongkong. It will be seen that the list has been more than doubled, and there still remain yet unrecognised species, especially among the smaller forms. Those we have not personally caught or seen are distinguished by an asterisk.

The distribution is worked out on the lines of Wallace's "*Geographical Distribution of Animals.*" Where query marks are inserted the sub-region is unknown to us, but the insect occurs in the region.

The standard geographical regions are as follows :—

I. PALÆARCTIC REGION.

Embracing Europe, N. Asia, and Africa north of Sahara. It is divided into four sections, numbered as under :—

1. *North Europe.*
2. *Mediterranean*, or S. Europe and N. Africa.
3. *Siberia.*

4. *Manchuria or Japan.* Includes China north of the Yangtse, except a strip of coast as far north as Chusan, which is included in the Indo-Chinese sub-region.

II. ETHIOPIAN REGION.

Divided into four sections numbered as under:—

1. *East Africa.*
2. *West Africa.*
3. *South Africa.*
4. *Madagascar.*

III. ORIENTAL REGION.

1. *Hindostan.*
2. *Ceylon.*
3. *Indo-China.*
4. *Indo-Malaya.*

IV. AUSTRALIAN.

1. *Austro-Malaya.*
2. *Australia.*
3. *Polynesia.*
4. *New Zealand.*

V. NEOTROPICAL.

1. *Chile.*
2. *Brazil.*
3. *Mexico.*
4. *Antilles.*

VI. NEARCTIC.

1. *California.*
2. *Rocky Mountains.*
3. *Alleghanies.*
4. *Canada.*

The regions that most concern us are the Oriental and Australian. The Indian sub-region consists of Central India from the foot of the Himalayas in the west, and south of the Ganges to the east, as far as a line drawn from Goa curving south and up to the Kistna river.

The Ceylonese sub-region consists of the southern extremity of India with Ceylon.

The Indo-Chinese—our own sub-region—comprises South China and Burmah, extending westward along the Himalayas to an altitude of 9,000 or 10,000 feet, and southward to Tavoy or Tenasserim. The Indo-Malayan sub-region comprises the Peninsula of Malacca and the Malay islands to Bali, Borneo, and the Philippines.

The Australian region comprises the remaining islands of the East Indian Archipelago, Australia, New Zealand, and the Pacific islands.

The Austro-Malayan sub-region includes the islands from Celebes and Lombock on the west, to the Solomon islands on the east.

The Australian sub-region comprises Australia and Tasmania.

The Polynesian sub-region includes all the tropical Pacific islands; and the New Zealand sub-region consists of

New Zealand, the Auckland, Chatham, and Norfolk Island groups.

It will be seen that the division line between the Palæarctic and Oriental regions passes through China curving southwards and westwards from Chusan, embracing the basin of the Yangtse except the coast line. Japan is thus Palæarctic [Manchurian] Formosa is Oriental, [Indo-Chinese], the Philippines are also Oriental, but belong to the Indo-Malayan sub-region, the Celebes form a sub-region of the Australian region. In judging of distribution these facts must be borne in mind, since it would clearly be wrong to conclude that an insect over-ran the Palæarctic and Australian regions, because it occurred at Shanghai and in the Celebes. The Manchurian sub-region 4 is conterminous with our Indo-Chinese sub-region 3, which is conterminous with the Indo-Malay region in the Philippines, and this is connected with the Indo-Australian sub-region 1 in the Celebes. Still it is clear that we are directly and closely connected with the Palæarctic Manchurian sub-region, and only indirectly with the Australian Austro-Malay sub-region.

If we analyse the *genera* a very strong alliance will be found with the Australian region and a very feeble one with the Palæarctic, showing, as do the plants, a marked tropical character. Thus one genus is confined to the Oriental and Palæarctic (*Hestina*) and this is only a tropical form struggling up the coast as far as Chusan and the valley of the Yangtse; while no less than sixteen genera extend into the Australian region, at least as far as Celebes. Eight genera are not known outside the Oriental region; seven spread from the Australian over the Ethiopian into the Palæarctic; seven are common to the Oriental, Australian, and Ethiopian. The *nine* universally distributed genera are *Danais*, *Junonia*, *Argynnis*, *Pyrameis*, *Lycæna*, *Thecla*, *Pieris*, *Terias* and *Papilio.* Tabulating the results we have—

Regions.						*Genera.*
		III.				8
		III.	IV.			16
I.		III.				1
	II.	III.				2
I.	II.	III.	IV.			7
	II.	III.	IV.			7
I.		III.	IV.			1
I.	II.	III.				1
	II.		IV.			1
I.	II.	III.	IV.	V.	VI.	9
I.		III.		V.	VI.	1
I.		III.	IV.	V.	VI.	1

A few genera have peculiar destributions and do not concern us at present. Nothing more strongly shows our tropical position than the above table, but the great feature is the almost complete severance of Hongkong from the Palæarctic region to the immediate north; a severance quite as complete as that between tropical Africa and S. Europe, in spite of the former glaciation of western Europe.

This comes out even stronger when we analyse the genera that reach the Palæarctic region. Omitting those that are cosmopolitan we find that of the thirteen genera that enter the Palæarctic no less than nine, namely *Euplœa*, *Melanitis*, *Mycalesis*, *Ypthima*, *Hestina*, *Neptis*, *Lethe*, *Terias* and *Baoris* are simply Oriental genera that have pushed their way northwards into China and Japan; and another, *Charaxes*, is an Ethiopian and Oriental form that reaches the Mediterranean coasts from Africa, and the last is one of the Skippers whose range is undetermined. It thus appears that all these forms are mere wanderers overstepping their usual bounds.

Turning now to the cosmopolitan forms we find two genera, *Argynnis* and *Vanessa*, which have their head-quarters in temperate regions, and these are each represented here by a single species. With *Pyrameis indica* they form the only true representatives of the northern fauna. Of these, *P. indica* has already been shown to be a representative of a well-known home species; *V. charonia* is Asiatic, reaching continental India and with representative forms in the Archipelago and Japan; and *A. niphe* extends from the Himalayas as far south as Australia in a slightly modified form called *A. inconstans*, *Butl.* It is clear, then, that the butterflies bear out the story of the plants, and show but a very slight connection with the north.

Some curious illustrations of African connection with tropical Asia are apparent, as in the genus *Charaxes*, which has its head-quarters in the dark continent, and the pretty little Erycinid, *Abisara*, which has been found in the Zambesi and Congo districts. Other cases of remarkable distribution will be found in the notices of the genera.

Butterflies are so light and aerial, so liable to be blown out to sea, that at first sight it would seem unlikely that any trace of original distribution would remain. But it must be remembered how many are dependent on certain plants, and that their area is necessarily circumscribed by that of the food-plant. Still the genera have very wide ranges in many cases, and this is doubtless owing to the enormous antiquity of the order. When we know that the genus *Vanessa* or *Junonia* has left its remains in the lower Miocene rocks of Croatia, and that *Cyllo*, a genus that is plentiful in the Oriental region, is even older (Upper Cretaceous), being represented by a genus called *Neorinopsis*, we need not wonder that these genera are still almost cosmopolitan.

The following list is simply put forward as being more complete than previous ones, and in the hope of stimulating others to take up the subject. Had we stayed to complete either the specific names, or the exact distribution of the species, the work would have been inconveniently delayed. It is here offered as a first attempt, and while much is left out that is known, nothing is inserted that has not been personally verified. Any collectors in China or Japan who would favour us with lists, or better still, the loan of specimens, would confer a great favour. It is hardly necessary to say that a list with mistakes of identification, or specimens without localities, are almost useless, and few seem aware how valuable an addition is the date of capture. Any such kind contributions may be addressed care of the publishers, Messrs. Kelly and Walsh, Ld.

GEOGRAPHICAL DISTRIBUTION OF GENERA.

III.	III. IV.	I. II. III. IV. V. VI.	II. III. IV.	I. II. III. IV.	I. III.
Ideopsis	Amathusia	Danais	Euplœa	Melanitis	Hestina
Radena	Discophora	Junonia	Ergolis	Mycalesis.	[1]
Pandita ?	Clerome	Argynnis	Hypolimnas	Ypthima	
Zemeros	Symbrenthia	Pyrameis	Atella	Charaxes	
Nacaduba	Euthalia	Lycœna	Abisara	Neptis	
Choaspes	Cethosia	Thecla	Catopsilia	Athyma	
Abisara	Cupha	Pieris	Ixias	Polyommatus	
Plesioneura	Cirrochroa	Terias	[7]	[7]	
[8]	Curetis	Papilio			
	Gerydus	[9]			
	Delias				
	Hebomoia				
	Leptocircus				
	Telicota				
	Erionota				
	Lampides				
	[16]				
II. III.	I. III. V. VI.	I. III. IV.	I. III. IV. V. VI.	I. II. III.	II. IV.
Loxura	Vanessa	Lethe	Apatura	Baoris	Tagiades
[1]	[1]	[1]	[1]	[1]	[1]

Total Genera 54.

REGIONS.

I.	*Palæarctic.*	IV.	*Australian.*
II.	*Ethiopian.*	V.	*Neotropical.*
III.	*Oriental.*	VI.	*Nearctic.*

RHOPALOCERA HONGKONGENSIS.

——	I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
Family NYMPHALIDÆ:—						
Sub-Family DANAIDÆ:	2 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Group DANAINA	..	..	..	..	..	..
Genus IDEOPSIS, *Horsf. & Moore* ..	..	..	3 4	..	..	..
1.—Ideopsis daos, *Boisd.*	..	..	3 4	..	..	..
Genus RADENA, *Moore*	..	..	1 2 3 4	..	..	..
2.—Radena sp.	..	..	2 3	..	..	..
Genus DANAIS, *Latr.*	2 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
3.—Danais chrysippus, *Linn.*	2 4	1 2 3 4	1 2 3 4	1	..	..
4.— genutia, *Cram.*	..	..	1 2 3 4	..	..	..
5.— similis, *Horsf. & Moore.* ..	..	..	3 4	..	..	..
6.— grammica, *Butl.*	..	..	2 3	..	..	..
7.— tytia, *Gray.*	4	..	1 3 4	..	..	..
Genus EUPLŒA, *Fabr.*	4	? 4	1 2 3 4	1 2 3	..	..
8.—Euplœa superba, *Herbst.*	..	..	3	..	..	..
9.— lorquinii, *Feld.*	..	..	3	..	..	..

RHOPALOCERA HONGKONGENSIS.—*continued.*

——	I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
Sub-Family SATYRINÆ:	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Genus MELANITIS, *Fabr.*	4	1 2 3 4	1 2 3 4	1 2 3	..	..
10.—Melanitis leda, *Linn.*	4	2 3	1 2 3 4	1 2 3	..	..
11.— ismene, *Cram.*	..	..	1 2 3 4	1 2	..	..
12.— tristis, *Feld*	..	..	1 3 4	..	..	..
Genus LETHE, *Hubn.*	4	..	1 3 4	1	..	..
13.—Lethe europa, *Fabr.*	..	..	1 3 4	1	..	..
14.— sp.	..	..	3	..	..	..
Genus MYCALESIS, *Hubn.*	4	1 2 3 4	1 2 3 4	1 2	..	..
15.—Mycalesis mineus, *Linn.*	..	..	1 2 3 4	..	..	..
16.— perseus, *Fabr.**	..	..	3	..	..	..
var. visala, *Moore**	..	..	3	..	..	..
17.— igoleta, *Feld**	..	..	3	..	..	..
18.— medus, *Fabr.*	..	..	1 ? 3 4	1	..	..
Genus YPTHIMA, *Hubn.*	4	1 2 3 4	1 2 3 4	1 2	..	..

19.—Ypthima asterope, *Klug.*	..	..	3	..	..	..
20.— philomela, *Hubn.*	..	..	3	..	..	..
Sub-Family NYMPHALINÆ:						
Group MORPHINA	..	..	1 2 3 4	1 3	2 3	..
Genus AMATHUSIA, *Fabr.*	..	..	1 3 4	1	..	..
21.—Amathusia phidippus, *Doub.*	..	..	3 4	1	..	..
Genus DISCOPHORA, *Boisd.*	..	..	1 2 3 4	1	..	..
22.—Discophora tullia, *Cram.*	..	..	1 3 4	1	..	..
Genus, CLEROME, *Westw.*	..	..	3 4	1	..	..
23.—Clerome eumœus, *Drur.*	..	..	3	..	..	..
Group NYMPHALINA	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Genus VANESSA, *Linn.*	1 2 3 4	..	1 2 3 4	..	3	3 4
24.—Vanessa charonia, *Drur.*	4	..	1 2 3	..	..	..
Genus JUNONIA, *Hubn.*	4	1 2 3 4	1 2 3 4	1 2 3	2	3
25.—Junonia atlites, *Auriv.**	..	..	1 2 3 4	..	..	..
26.— asterie, *Linn.*	4	..	1 2 3 4	1	..	..
27.— lemonias, *Linn.*	..	..	1 2 3 4	..	..	..
28.— orithya, *var.* andromeda, *Linn.*	..	..	1 2 3 4	1 2*	..	..
29.— hierta, *Fabr.*	..	..	2 3	..	..	..
[J. *almana*=winter form of J. *asterie*]						

---

* The particular variety is Chinese only.

RHOPALOCERA HONGKONGENSIS.—*continued.*

——	I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
Genus SYMBRENTHIA, *Hubn.*	..	..	1 2 3 4	..	..	..
30.—Symbrenthia hippoclus *Cram*	..	..	1 2 3 4	..	..	..
Genus CHARAXES, *Ochs.*	2	1 2 3 4	1 2 3 4	1 2 3	..	..
31.—Charaxes sp.	..	..	3	..	..	..
32.— sp.	..	..	3	..	..	..
33.— sp.	..	..	3	..	..	..
Genus EUTHALIA, *Hubn.*	..	..	1 2 3 4	1	..	..
34.—Euthalia phemius *Doubl.*	..	..	3	..	..	..
Genus ERGOLIS, *Boisd.*	..	1	1 2 3 4	1	..	..
35.—Ergolis ariadne, *Linn.*	..	..	1 3 4	1	..	..
Genus PANDITA, *Moore.*	..	..	3 4	..	..	..
36.—Pandita sp.	..	..	3	..	..	..
Genus NEPTIS, *Fabr.*	2 4	1 2 3 4	1 2 3 4	1 2	..	..
37.—Neptis eurynome, *Westw.*	..	..	3 4	..	..	..
38.— sp.	..	..	3	..	..	..
Genus ATHYMA, *Westw.*	4	3 4	1 3 4	..	..	..

39.—Athyma perius, *Linn.*	..	..	1 3 4	..	..	..
40.— sulpitia, *Cram.*	..	..	3	..	..	..
41.— nefte, *Cram.*	..	..	1 3 4	..	..	..
Genus HYPOLIMNAS, *Hubn.* ..	..	1 2 3 4	1 2 3 4	1 2	2 4	3
42.—Hypolimnas misippus, *Linn.*	..	1 2 3 4	1 2 3 4	1 2*	2* 4	3
43.— bolina, *Linn.*	..	..	1 2 3 4	1 2 3 4	..	..
Genus HESTINA, *Westw.*	4	..	1 3 4	..	..	..
44.—Hestina assimilis, *Doubl.*	4	..	3	..	..	..
45.— sp.	..	..	3	..	..	..
Genus CETHOSIA, *Fabr.*	..	..	1 2 3 4	1 2	..	..
46.—Cethosia biblis, *Drur.*	..	..	1 3 4	..	..	..
Genus ATELLA, *Doub.*	..	2 3	1 2 3 4	1 2 3	..	..
47.—Atella phalanta, *Drur.*	..	..	1 2 3 4	2	..	..
Genus CUPHA, *Billb.*	..	..	1 2 3 4	1	..	..
48.—Cupha erymanthis, *Drur.*	..	..	1 2 3 4	..	..	..
Genus CIRROCHROA, Doubl. ..	..	..	1 2 3 4	1	..	..
49.—Cirrochroa rotundata, *Butl.*	..	..	3 4	..	..	..
50.— satellita, *Butl.*	..	..	3 4	..	..	..
Genus APATURA, *Fabr.*	1 2 3 4	..	1 3 4	1	2 3	1 2 3 4

---

* Naturalised in Guiana and N. W. Australia, the Antilles and Florida.

RHOPALOCERA HONGKONGENSIS.—*continued.*

	I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
51.—Apatura sp.	..	..	3	..	..	..
Genus ARGYNNIS, Linn.	1 2 3 4	1	1 2 3 4	2	1 4	1 2 3 4
52.—Argynnis niphe, *Linn.*	4	..	1 2 3	2	..	..
53.— childreni, *Gray.* ?	4	..	1 3	..	..	..
Genus PYRAMEIS, *Hubn.*	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
54.—Pyrameis cardui, *Linn.*	1 2 3 4	1 2 3 4	1 2 3 4	1 2 4	3 4	1 2 3 4
55.— indica, *Herbst*..	2 4	..	1 2 3	..	..	..
Family ERYCINIDÆ:—	1 2	2 4	1 2 3 4	1	2 3 4	1 2 3
Sub-Family NEMEOBIINÆ:	1	2 4	1 3 4	1	2 3	2 3
Genus ZEMEROS, *Boisd.*	..	..	1 3 4	..	..	..
56.—Zemeros flegyas, *Cram.* ?	..	..	3	..	..	..
Genus ABISARA, *Feld.*	..	1 2 4	1 3 4	1	..	..
57.—Abisara kausambi, *Feld.*	..	1 2 4	1 3 4	..	..	..
Family LYCÆNIDÆ:—	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Group CURETARIA	4	1 2 3 4	1 2 3 4	1 2	3	..

Genus CURETIS, *Hubn.*	..	..	1 2 3 4	1	..	..
58.—Curetis sp.	..	..	3	..	..	..
Genus GERYDUS, *Boisd.*	..	..	3 4	1	..	..
59.—Gerydus chinensis, *Feld...*	..	..	3	..	..	..
Group CASTALARIA	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Genus LAMPIDES, *Hubn.*	..	..	1 2 3 4	1 3	..	..
60.—Lampides ælianus. *Butl.*	..	..	1 2 3 4	1	..	..
Genus POLYOMMATUS, *Latr.* ..	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	..	..
61.—Polyommatus bœticus, *Linn.*	1 2 4	1 2 3 4	1 2 3 4	1 2 3	..	..
Genus LYCÆNA, *Boisd*, ...	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
62.—Lycæna argea	..	..	3	..	..	..
63.— sp.	..	..	3	..	..	..
64.— sp.	..	..	3	..	..	..
Genus NACADUBA, *Moore.*	..	..	1 2 3 4	..	..	..
65.—Nacaduba ?	..	..	3	..	..	..
Group APHNARIA	..	1 2 3	1 2 3 4	1	..	..
Genus THECLA, *Fabr.*	1 2 3 4	?	1 2 3 4	1	1 2 3 4	1 2 3 4
66.—Thecla sp.	..	..	3	..	..	..
67.— sp.	..	..	3	..	..	..

Rhopalocera Hongkongensis.—*continued.*

——.	I. Palæarctic.	II. Ethiopian.	III. Oriental.	IV. Australian.	V. Neotropical	VI. Nearctic.
68.— sp.	..	..	3	..	..	..
Genus Loxura, *Horsf.*	..	3	1 3 4	..	..	..
69.—Loxura sp.	..	..	3	..	..	..
Family PAPILIONIDÆ	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Sub-Family PIERINÆ	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4
Genus Delias, *Hubn.*	..	..	1 3 4	1 2 3	..	..
70.—Delias pasithöe, *Linn.*	..	..	3 4	..	..	..
71.— hierte, *Hubn.*	..	..	3	..	..	..
Genus Pieris, *Boisd.*.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4
72.—Pieris canidia, *Spar.*	..	..	3	..	..	..
73.— coronis, *Cram.*	..	..	2 3	..	..	..
74.— sp.	..	..	3	..	..	..
Genus Catopsilia, *Hubn.*	..	1 2 3 4	1 2 3 4	1 2 3 4	..	..
75.—Catopsilia catilla, *Cram.*	..	..	1 2 3 4	1 2 4	..	..
76.— chryseis, *Drur.*	..	..	1 2 3 4	1 2	..	..
77.— crocale, *Cram.*	..	..	1 2 3 4	1 2	..	..

Genus TERIAS, *Swains.*	4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	3
78.—Terias hecabe, *Linn.*	4	..	1 2 3 4	1 2 3	..	..
79.— sp.	..	..	3	..	..	..
80.— sp.	..	..	3	..	..	..
81.— sp.	..	..	3	..	..	..
Genus IXIAS, *Hubn.*	..	1	1 2 3 4	1	..	..
82.—Ixias pyrene, *Linn.*	..	..	2 3	..	..	..
83.— sp.	..	..	3	..	..	..
Genus HEBOMOIA, *Hubn.*	..	..	1 2 3 4	1	..	..
84.—Hebomoia glaucippe, *Linn.*	..	..	1 2 3 4	..	..	..
Sub-Family PAPILIONINÆ.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4
Genus PAPILIO, *Linn.*	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4
85.—Papilio memnon, *Wallace's Group.*	..	..	1 3 4	..	..	..
var. phœnix, *Dist.*	..	..	3 4	..	..	..
var. achates, *Cram.*	..	..	1 3	..	..	..
86.— helenus, *Linn.*	..	..	1 2 3 4	1	..	..
87.— polytes, *Linn.*	4	..	1 2 3 4	1	..	..
88.— erithonius, *Cram.*	..	..	1 2 3 4	..	..	..
89.— dissimilis, *Linn.*	..	..	1 2 3 4	..	..	..
var. panope, *Linn.*	..	..	3 4	..	..	..

RHOPALOCERA HONGKONGENSIS.—*continued.*

		I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
90.—	antiphates, *Cram.*	..	..	1 2 3 4	..	..	..
91.—	sarpedon, *Linn.*	4	..	1 2 3 4	1	..	..
92.—	telephus, *Feld.*	..	..	2 3 4	..	..	..
93.—	agamemnon, Linn.	..	..	1 2 3 4	1	..	..
94.—	paris, *Linn.*	4	..	1 3	..	..	..
95.—	bianor, *Cram.*	4	..	3	..	..	..
96.—	rhetenor, *Cram.*	..	..	3	..	..	..
97.—	xuthus,* *Linn*	4	..	3	..	..	..
	Genus LEPTOCIRCUS, *Swains.*	..	..	1 3 4	1	..	..
98.—	Leptocircus *sp. nov.*?	..	..	3		..	..
	Family HESPERIIDÆ	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	Group ISMENARIA	1 2 3 4	1 2 3	1 2 3 4	1 2 3	1 2 3 4	1 2 3 4
	Genus CHOASPES, Moore.	..	..	1 3 4	..	..	..
99.—	Choaspes sp.	..	..	3	..	..	..
	Genus BAORIS, *Moore.*	4	?	1 2 3 4	..	..	..
100.—	Baoris mathias, *Fabr.*	4	..	1 2 3 4	..	..	..

Genus TELICOTA, *Moore.*	..	..	1 2 3 4	1 2	..	..
101.—Telicota bambusœ, *Moore.*	..	..	1 3 4	..	..	..
102.— mæsioides, *Butl.*	..	..	2 3 4	..	..	..
Genus TAGIADES, *Hubn.*	..	?	1 3 4	..	..	..
103.—Tagiades sp.	..	..	3	..	..	..
Genus ABARATHA, *Moore.*	..	..	1 2 3 4	..	..	..
104.—Abaratha sura, *Moore*	..	..	1 3 4	..	..	..
Group ERIONOTARIA..	..	..	1 2 3 4	1	..	..
Genus ERIONOTA, *Mab.*	..	..	1 3 4	1	..	..
105.—Erionota thrax, *Linn*	..	..	1 3 4	1	..	..
Genus PLESIONEURA, *Feld*	..	..	1 2 3 4	..	..	..
106.—Plesioneura folus, *Cram.*	..	..	1 2 3 4	..	..	..

SPECIES THAT MAY PROBABLY BE FOUND IN HONGKONG.

Thaumantis sp.—This fine genus is recorded as far north as Shanghai.

Neptis columella, Cram.—A large species with a concave spot on the inner margin of the forewing. Locality 'China.' [We have since obtained it.]

Euthalia merta, Moore.—A very rare species, of which only the dusky female is yet known. It is doubtfully recorded from China.

RHOPALOCERA HONGKONGENSIS.—ADDENDA.

	I. PALÆARCTIC.	II. ETHIOPIAN.	III. ORIENTAL.	IV. AUSTRALIAN.	V. NEOTROPICAL	VI. NEARCTIC.
107.—Papilio aristolochiæ, *Fabr.*	4	..	1 3 4	..	..	..
108.—Spindasis syama, *Horsf.*	..	..	3 4	..	..	..
109.—Hasora vitta, ? *Butl.*	..	..	3 4	..	..	..
110.—Matapa aria, *Moore.*	..	..	1 2 3 4	..	..	..
111.—Baoris narooa, *Moore.*	..	..	1 2 3 4	..	..	..
112.—Hyarotis adrastus, *Cram.*	..	..	1 2 3 4	..	..	..
113.—Tajuria longinus, *Fabr.*	..	..	1 2 3 4	..	..	..
114.—Deudorix epijarbas, *Moore.*	..	...	1 2 3 4	..	..	..
115.—Catochrysops strabo, *Fabr.*	..	..	1 2 3 4	1	..	..
116.—Zizera.	..	..	1 3 4	..	..	..

NOTE.—In Natural order No. 107 precedes *P. memnon* No. 85.
" " " " 108 " *Thecla* " 66.
" " " " 109 follows *Choapses* " 99.
" " " " 110 " *Hasora* "
" " " " 111 " *B. mathias* " 100.
" " " " 112 " *Erionota* " 105.

The range of the species of Hesperiidæ has not yet been worked out. The whole family is undergoing revision. *Spindasis* is Ethiopian as well as Oriental. *Hasora* seems to be purely Oriental. as are *Matapa* and *Hyarotis*. *P. aristolochiæ* enters the Palæarctic Region on our coast, being found in Chekiang and Kiangsu.

NOTES ON THE GENERA AND SPECIES OF BUTTERFLIES IN THE PRECEDING LIST.

Genus *Ideopsis.*—This diaphanous, black-spotted genus is inserted on the authority of the collections in the British Museum and at Oxford, but we have neither taken nor seen a specimen in Hongkong. Its habits, as we know it in the Archipelago, are those of *Hestia*, with which it flies in the forest. It is not a likely insect to occur in a comparatively bare island like this.

Genus *Radena.*—We have taken a species of this genus flying with *Danais similis*, &c., which it somewhat resembles. It is close to, but not identical with *R. Juventa*, *Cram.*, which occurs as near us as the Philippines, and is found in the Archipelago and the Malay Peninsula. It is easily distinguished when flying by its pale colour.

Genus *Danais.*—This interesting genus is very common here; *D. tytia* being the rarest. *D. genutia*, *similis* and *grammica*, are abundant, *D. chrysippus* less so, and *D. tytia* is decidedly rare. These insects are interesting as being almost cosmopolitan in distribution, and they are still extending their bounds. Thus the fine tawny *D. plexippus*, with which our *D. genutia* has been confounded, has recently spread from its American home over all the Pacific Islands to New Guinea, Australia and Tasmania. It has reached the Azores, Gibraltar and La Vendée, and many stragglers have even occurred in England. As it feeds on the so-called wild ipecacuanha (*Asclepias curassavica*), a wanderer like itself that has reached here, we may yet find the American cousin of our species turning up in Hongkong. The larvæ of *D. chrysippus* and *D. genutia* feed here upon the same plant.

Danais is also remarkable from being mimicked by many species. In Hongkong *Papilio dissimilis* and *Hestina assimilis*, seem to mimic *D. similis* and *D. grammica*, and certainly fly with them, though *H. assimilis* goes as far north as Chusan, where the particular Danaids are absent. Further observation alone can decide whether this is an actual case of mimicry, or only an accidental resemblance. It is remarkable that a precisely parallel case of complex mimicry in the same genera occurs in Northern India in *Danais tytia*, *Hestina nama*, and *Papilio agestor*. In the red group of *Danais*, *D. genutia* is closely mimicked by the female of *Argynnis niphe*, which flies in company with it in the Happy Valley, but is much scarcer. Another case of triple mimicry has been observed by one of us in N. W. Australia, where *D. chrysippus*, *Cethosia penthesilea* and the female of *Diadema misippus*, fly together and are scarcely distinguishable from one another on the wing.

Genus *Euplæa*.—This superb genus of large, dark, purple-flushed butterflies is represented by two species which are common everywhere in shady places. They fly slowly and like *Danais*, are "protected" and have strong vitality. The pupæ are veritable "chrysalides," shining with metallic green-gold. The larva of the larger species *E. superba* feeds on *Strophanthus divergens*, and that of the other species

E. lorquinii, has been found and reared by Dr. Beveridge, A.M.D. on the oleander, an introduced shrub of the same natural order.

Genus *Melanitis*.—These sombre twilight-flying butterflies have achieved renown at the hands of Darwin, and been favoured with a memoir by Butler, yet they merit much further study. We believe *M. leda* is only the summer form of the insect that has *M. ismene* for its winter form, though we have seen both forms flying together in Borneo and Hongkong. At Ponape, in the Caroline Is. the common form is one that occurs occasionally in Hongkong, It is very small and obscurely coloured. The distinctness of the grey-pencilled ocellated underside of *leda* from the dead-leaf decoration of *ismene* is very striking, but every intermediate gradation can be found ; and only when large numbers are bred can the question of identity be settled.

Genus *Lethe*.—One species *(L. europa)* is pretty common in shady places and flies higher then most satyrs. It has a habit of settling on the leaves of low trees with wings opened flat.

Genus *Mycalesis*.—This and the succeeding genus take the place of our Meadow Browns at home, though this genus delights in dark shady places and is fond of settling on the ground. It is very variable, and probably all our specimens are but varieties of *M. mineus*. Of this species there are two very marked seasonal forms, that occurring in winter being much darker and having small or obsolete eye-spots beneath, the summer form being paler with fine large ocelli.

Genus *Ypthima*.—Though two species are recorded, we are only sure of one, and are not certain of its specific identity. In this and many other cases, only comparison with specimens authoritatively named can settle the question of specific identity.

Genus *Amathusia*.—Never taken in Hongkong. One is reported to have been seen near St. John's Cathedral, by an observer who knows the insect, but it was probably a mistake for *Discophora*. *Amathusia* frequents coco-nut trees, flying just before sunset.

Genus *Discophora*.—*D. celinde* most likely occurs here, but we only actually know the species recorded.

Genus *Clerome*.—Our species is very common here, though it is almost unknown in collections at home. It flies nearly all the year round, and is common even in the streets of the city, and its slow weak flight and habit of settling in the road, make it look like a brown leaf wafted by the breeze. It is, however, difficult to get in good condition as it soon damages itself.

Genus *Vanessa*.—Our solitary blue-banded species is common on rocks in ravines, where it is fond of settling with open wings, but is so shy that on the least commotion it closes the wings and sits almost invisible on the dark stones. The larva has been found plentifully on a species of *Smilax*. *V. charonia* is represented in the Malay region by *V. peraka*, but is identical with the Indian form.

Genus *Pyrameis*.—The ubiquitous *P. cardui*, the Painted Lady of our schooldays, is of course here, as it is in most places, having even got to New Zealand, under a slightly modified form. We have a large and small variety, but the insect does not attain its average size in our island. *P. indica* is very widely distributed and appears to replace in southern latitudes the Red Admiral (*P. atalanta*) in the eastern hemisphere. It is found (naturalized) in Portugal, and is native to Madeira, the Canaries, India and at least as far north in China as the valley of the Yangtze.

Genus *Junonia.*—Our species are not uncommon in dry open places, and *J. orithya* is most variable. *J. almana* is only the winter form of *J. asterie*, the ocellated spots on the underside being obsolete. This winter form presents an excellent example of protective resemblance. The underside is nearly as perfect an imitation of a dead leaf as that of the more celebrated *Kallima* of India and the Eastern Archipelago.

Genus *Symbrenthia.*—The single species we possess is not common except in the Happy Valley, where it flies about with the floating motion of a brown *Neptis*, which it resembles but does not seem really to mimic.

Genus *Charaxes.*—Three species, at least, occur; but we have not yet determined them. None are common. The smallest species is almost certainly *C. athamus, Doubl.*

Genus *Euthalia.*—Our species is not uncommon but is hard to obtain, being a tremendously swift flier, with a habit of settling out of reach on trees. Though essentially a tree-lover it often comes into the towns and even enters houses. When pitched on a leaf with wings fully expanded, as is its habit, it may be actually touched with the net without frightening it away.

Genus *Ergolis.*—Common on sunny banks, where its rich brown hue is very conspicuous. Though neither a protected form nor a strong flier, it never seems to conceal itself on the plentiful brown surfaces, but sits open-winged on green herbage in a most unscientific manner.

Genus *Pandita.*—Of doubtful occurrence.

Genera *Neptis* and *Athyma.*—These beautiful black and white insects are common in all sunny places, and their peculiar sailing flight, with wings horizontal, is one of the most graceful in the insect world. The female *A. nefte* is superficially like a large *Symbrenthia.*

Genus *Hypolimnas.*—These fine Purple-Emperor-like butterflies are more often seen than taken, as they are strong, active, and affect high places. *H. bolina* is very variable, in the female sex, and Darwin has pointed out the peculiar arrangement of scales around the white spots of the forewings which seem almost to glow with blue phosphorescent light when viewed from in front, but not when seen from behind. *H. misippus* is interesting from its female almost exactly mimicing *Danais chrysippus.* It is very rare in Hongkong.

Genus *Hestina.*—The beautiful *H. assimilis* has already been referred to as mimicing two species of *Danais.* Its flight, however is much steadier and stronger than that of *Danais*, and it is thus best distinguished. It is considered a rare insect, but is not uncommon in the Happy Valley, and on the adjacent mainland near the Association Range in British Kowloon. Its rarity is perhaps due to its being mistaken for the commoner butterfly it mimics, though of course it is not so common as the insects it copies. A very pallid species, larger than *H. assimilis*, and without the crimson spots, has hitherto been very rare. We took a single specimen in May 1892, and Dr. Beveridge this year, 1893, bred a specimen from a green slug-like larva with two long branched horns on the head. As we write (April 20th, 1893) it is fairly common in Kowloon and on the island. It frequents the tops of trees, but descends when courting and then settles on low shrubs on even or the ground, and is easily taken.

Genus *Cethosia.*—This beautiful orange-red, elegantly scalloped insect seems to be rare in Hongkong, but is said to be common on the little off-lying island of Waglan. It flies rapidly and likes rough rocky ground with a tangle of undergrowth. Its marriage-flight is very curious to watch as the male carries the female a long distance, and the bridal pair finally settle, generally high up on a tree trunk. Its probable food plant on Waglan is the naturalised American plant *Passiflora fœtida*, which grows there abundantly.

Genera *Atella* and *Cupha.*—The small brown and black *Atella phalanta* is rare. *Cupha*, wherever there is undergrowth or small trees, is abundant. They delight to settle on leaves, and generally affect a height of about ten feet from the ground. *Cupha* lives all through the year and worn specimens are only too numerous. The green spiny larva feeds on *Glychidion eriocarpum*, *Champ.*, and the pupa is like burnished gold.

Genus *Apatura.*—This genus, to which our Purple Emperor belongs has one representative here. It is uncommon and we have not yet determined the species. It is remarkable for the uniform deep burnt-umber tint of the upper surface; and has no purple flush.

Genus *Argynnis.*—This, the Fritillary genus, is one of our true northern forms, and *A. niphe* goes north to Japan, Shanghai, and Chusan, in which latter locality we found it with the magnificent Indian *A. childreni.* This last has never been taken in Hongkong, but was reported as seen on Tai-mo Shan on the adjacent mainland by Dr. Bassett-Smith R.N., who is familiar with the species in Chusan.

Genera *Zemeros* and *Abisara* represent the family Erycinidæ in our fauna, a group that attains its finest development in tropical America. The *Abisara* is peculiar as being the same species that has been found in East Africa. These pretty little ruddy-brown butterflies are very common in every ravine, taking short jerky flights and settling on stones and leaves low down. Though nimble, they cannot compare in this respect with their relatives in the Archipelago. Though so purely tropical they may be found in sunny spots throughout our winter, though the unprecedented frost of this year (1893) killed them all in a few days.

Genus *Curetis.*—This curious butterfly, fulvous above in the males, almost pure white below, is quite Oriental, just reaching the Celebes, however. Here they are rare, but in Borneo we have watched them often, and their habits are peculiar. They are great lovers of sunshine, and in the forest dart about with amazing rapidity, suddenly settling on grey bark, closing their wings and becoming invisible. There we find rocks by the streams covered with a pale enamel-like lichen, which exactly matches the underside of *Curetis.* On this lichen they love to pitch, and though so shy on the wing, they feel perfectly secure in their protected garb when at rest, so that they could always be picked up with the fingers. In the net they beat themselves to pieces, so the best specimens are obtained by taking a mean advantage in their faith in Wallace's 'protective resemblance.' Like *Catopsilia* they dote on salt fish.

Genus *Gerydus.*—Our species of this curious thick legged genus is the great prize of the island, for it has not been taken elsewhere. It is a dusky little fellow, quite rare, but turns up now and then in the Happy Valley.

The other Lycænidæ, comprising the Blues and Hairstreaks, are as yet in a hopeless state of confusion, having neither been collected, named, nor described accurately. Dr. Zeite of Bonn paid attention to them while here, and we have done something in that way also, but an open field still remains for collectors. The ubiquitous *P. bœticus*, which has even occurred in England, is common, and a splendid *Loxura* is not rare. It has a great liking for the flowers of *Poinsettia* in December.

Genus *Delias.*—Two species occur but are not common. They are fond of keeping high among trees.

Genus *Pieris.*—The two species exactly counterbalance our *P. rapæ* and *P. napi* at home, and like the latter *P. coronis* has light and dark seasonal forms. *P. canidia* absolutely swarms about May.

Genus *Catopsilia.*—These handsome pale yellow butterflies were formerly united under the name *Callidryas*, with their American relatives which are now considered to be a distinct genus. They are quite common, flying over low bushes, sometimes so swiftly as to be the despair of collectors; at other times, when intent on feeding, they may be picked up with the fingers. They take the place of our own Brimstone butterfly, but are far more common. In Borneo we have seen *Catopsilia* drinking on wet sand in hundreds, looking like a white patch. *Hebomoia* often concealed itself among them. They seldom mixed with coloured species like *Papilios*, which took up 'pitches' of their own, but like them seemed to have a strong love for salt, and would always gather where the natives had washed their salt fish.

Genus *Terias.*—These pretty little yellow butterflies, which flit everywhere in sunshine and shade like golden spangles, belong to the tropics of both worlds. Their specific limits are difficult to determine, as they are very variable. We certainly have four true species, but only *T. hecabe*, in its many forms, is common throughout the year.

Genus *Ixias.*—This handsome yellow, orange-tipped genus is not rare, especially in the Happy Valley, but is difficult to catch. Another genus of *Pieridæ*, *Appias*, has just been observed by us. It is a cream coloured form, with very pointed wings.

Genus *Hebomoia.*—A grand species, is ours, like a great Orange-tip. It has a habit of flying high and swiftly on regular beats, and at other times pitching provokingly out of reach, but it can be lured down by a decoy, or even by a paper counterfeit. Its habit of drinking with *Catopsilia* has been described, but it needs no such protecting body-guard, for the under surface of its hind-wings are irrorated with grey specks so that it becomes almost absolutely invisible when settled on damp sand.

Genus *Papilio.*—Of this favorite genus we have at least thirteen species, besides many varieties. The fine dark insect known as *Memnon* is the type of a group, and the local form is often called *agenor*. This insect possesses two remarkable modifications in the female sex, one being much suffused with white and not having tails, the other with less white and well-developed tails. One of our tailed forms agrees with the Malayan form named *phœnix* by Distant, another is Cramer's *achates*, and other undescribed varieties also occur. *P. polytes* is the female *P. pammon*, *Linn.* Of the *sarpedon* group other forms besides *telephus* may perhaps be formed by searching. *P. paris* and *P. bianor*, our handsomest species, black with gold-green scattered scales, the one with a brilliant blue spot the other with a suffused green blotch on the hind wings, are remarkable as going as far north as Pekin. *P. rhetenor* is rare here, as also is the black and yellow *P. xuthus*. This species perhaps here reaches the southern limit of its distribution, and is plentiful in the Chusan Archipelago, at Shanghai and in Japan.

The larvæ of *P. polytes* and *P. helenus* are readily found on the leaves of the pomelo and other trees of the orange family.

The elegant transparent long-tailed *Leptocircus* has been referred to *L. ennius* of Felder, but it does not agree with his original figure (Reise der Novara, XXI., fig b) or description; neither is it *decius* nor *curius*. Not having access to other collections, we cannot yet say whether it is an undescribed species or not. It has only been taken in the Happy Valley, where we found it plentiful in February, and March, 1892, and easily taken as it fed upon the flowers of *Buddlæs asiatica.* It has also been taken at flowers of verbena, heliotrope and rose. It is quite rare this year, 1893.

In Borneo it is a very swift flier along the streams, and almost impossible to catch, save about 8 a.m., when it settles on the sand to drink. It holds up the long tails when thus pitched on the ground, and has a remarkable habit of pumping out water from behind like a little fire-engine, as it drinks. The tiny stream is projected at least two inches. When feeding it rapidly quivers its wings and tails, and looks almost hazy.

Of the Hesperiidæ, or Skippers, one can say nothing new. They require further study, and fresh species are pretty sure to be added to the list. We have found two other species since writing this. The conspicuous and handsome skipper, *Erionota thrax*, was bred freely by Dr. Beveridge in 1892 from larvæ found in rolled up banana leaves.

In conclusion, we urge upon all collecters the paramount necessity of labelling their *specimens* with locality and date of capture. A small square of paper stuck *on the pin*, beneath the insect, will contain this information, and it cannot then be lost. To illustrate the difference this makes to the scientific value, we may state that a few years ago a collection of English butterflies which had every specimen dated and with locality given sold for over a hundred and fifty gunieas. The same species without the labels could be bought for forty shillings.

Printed by
KELLY & WALSH, Limited, Hongkong.

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00767 3544